A STUDY TO ASSESS THE EFFECTIVENESS OF BEETROOT EXTRACT ON REDUCING ANAEMIA AMONG ANTENATAL MOTHERS AT ARAVINDAN HOSPITAL, COIMBATORE

By

Reg. No: 301221101

A DISSERTATION SUBMITTED TO THE TAMIL NADU Dr. M. G. R. MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

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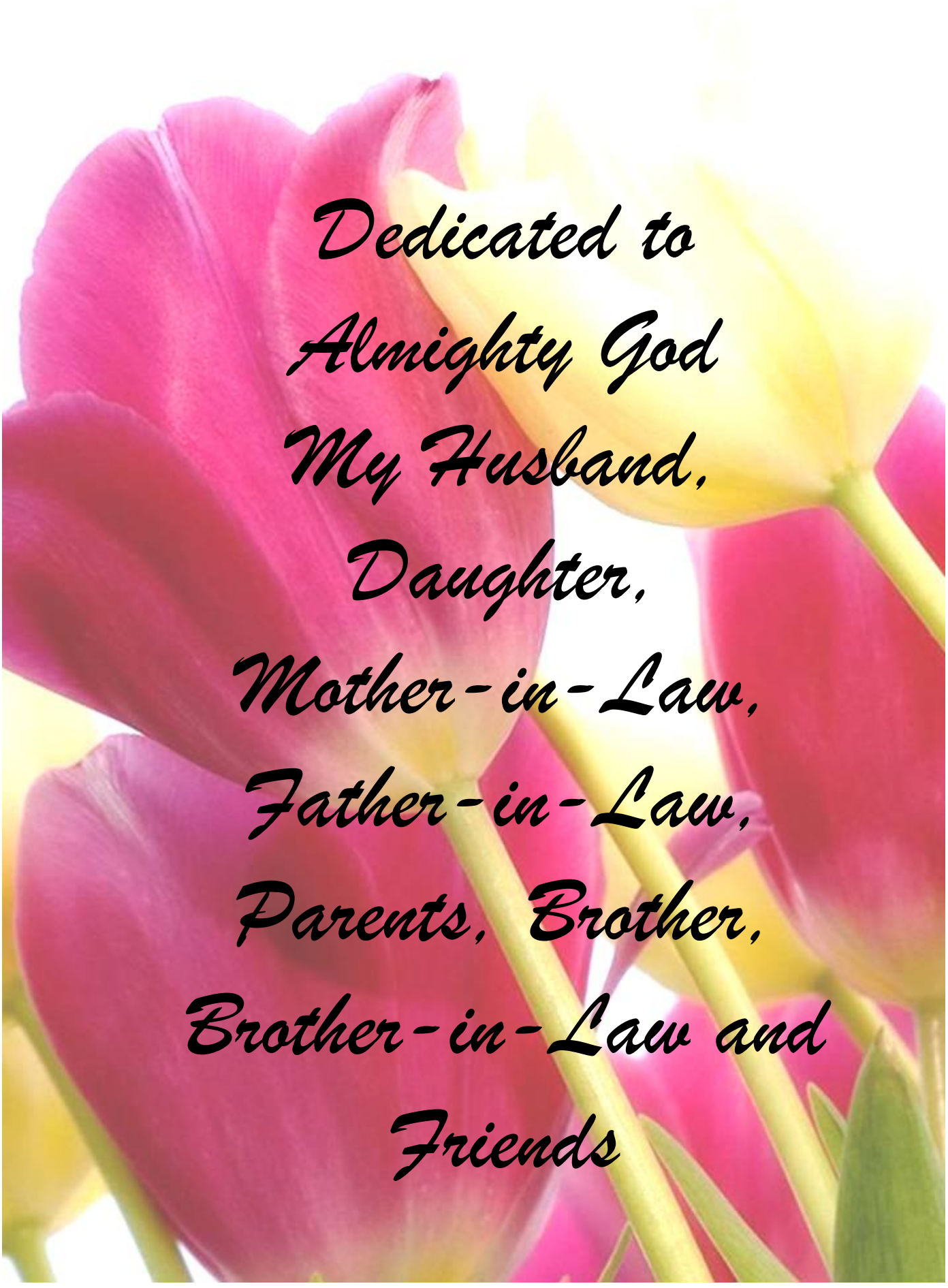
Dedicated to
Almighty God
My Husband,
Daughter,
Mother-in-Law,
Father-in-Law,
Parents, Brother,
Brother-in-Law and
Friends

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CHAPTER – I

Introduction

An ounce of prevention is worth

A pound of cure

- Swami Vivekananda

Health has been recognized as a fundamental right to all human beings, which implies of right to good physical and mental health. Maternal health is the nation's wealth. Women is more affected with some health disorders. Nutritional adequacy is one of the key determinants of the quality of human resources for women. Most preventable but yet more prevalent

WHO (2012) stated that anaemia is the most common nutritional deficiency disorder in the world, which contributes as a leading cause, complications of pregnancy and its outcome. It has estimated that the prevalence of anemia in developed countries is 14% and in the developing countries is 51%. In India the prevalence as 65-75%, about 1/3 of the global population is anemic. India has the highest prevalence of anemia and 41.8% of pregnant women worldwide are anaemic

Millennium Development Goal (MDG) (2012) pointed that India recorded around 57, 000 maternal deaths in 2010, which translate into a whopping six every hour and one every 10 minutes, The current Maternal Mortality Rate (MMR) of India is 212 per one lakh live births, whereas the country`s related to maternal in this respect is 109 per one lakh live births by 2015.

WHO (2012) stated that anaemia in pregnancy is an important public health problem worldwide. Estimates that more than half of pregnant women in the World have a, haemoglobin level indicative of anaemia (< 11.0gldl), the prevalence may however be as high as 56 or 61% in developing countries. Women often become anaemic during pregnancy because the demand for iron and other vitamins is increased due to physiological burden of pregnancy. The inability to meet the required level for these substances either as a result of dietary deficiencies or infection gives rise to anaemia.

WHO (2012) stated that Anaemia ranges from mild, moderate to severe and the haemoglobin level for each of these types of anaemia in pregnancy at 10.0 – 10.9g/d1 (mild anaemia) 7 – 9.9g/dl (moderate anemia) and < 7g/dl (severe anaemia). Prevalence of anaemia can be as high as 61% in developing countries with a high incidence and severity occurring among primigravidae.

Park. K (2011) explained that Women and children constitute a priority group. About one half of pregnant women and young children are estimated to suffer from anaemia 60 to 80% of pregnant women are anaemic

Dutta (2011) mentioned that anaemia is a condition in which there is decline in the circulating red blood cell mass, which reduces the capacity to carry oxygen to the vital organs of the mother and fetus. During pregnancy and puerperium, anaemia is defined as haemoglobin concentration of less than 10.5 to 11g/dl. According to the standard laid down by WHO, anaemia in pregnancy is present when the haemoglobin concentration in the peripheral blood is 11g/dl or less. During pregnancy plasma volume expands, maximum around 32 weeks, resulting in hemodilution. For this

reason, haemoglobin level below 10g/dl at any time during pregnancy is considered anaemia. Haemoglobin level at or below 9g/dl requires detailed investigation and appropriate treatment. Anaemia is responsible for 20% of maternal deaths in the developing countries.

Ghulam Nabi Azad (2013) pointed that the national rural health mission, a national "iron plus" initiative has been launched in which Weekly Iron and Folic Acid Supplementation (WIFS) is given to adolescent girls, boys and all women in the reproductive age group.

Murphy, O'Riordan, et.al., (2009) stated that Anemia is not a disease but actually is a condition that results in a group of symptoms such as weakness, fatigue, vertigo, dizziness, pallor, headache, ringing in the ears, headache, an inability to catch ones breath after physical exertion, and a racing or irregular heart beat. Some women are asymptomatic, but many become tired easily. Anemic mothers are increasingly susceptible to infection, postpartum hemorrhage, and have poor tolerance for even minimal blood loss during birth.

Bobak (2008) mentioned that Iron is an important factor in anemia because iron is used to make hemoglobin, which is the component of red blood cells that attaches to oxygen and transports it. Iron deficiency can be caused by insufficient dietary iron intake and or absorption, or by significant blood loss. Pregnant (and consequently lactating) women are amongst the highest groups at risk for iron deficiency. Women become anemic due to the excessive blood losses of menstruation and delivery, increased iron requirements, diminished intake, diminished iron absorption or utilization, or a combination of these factors. Iron deficiency occurs in

over 33-58% of young, healthy pregnant women. A mild decrease in hemoglobin is a normal physiologic response to the increases in intravascular volume and demand for erythropoiesis during pregnancy. Anemia occurs with such frequency during pregnancy that it is referred to as “the most common medical complication of pregnancy. ”

Katie Eliot, et.al., (2012) explained that pregnancy, a woman’s body goes through several changes. Furthermore her body is host to the growing baby inside and her body is the source of its food and nutrition in general. It is therefore important to nourish the body constantly so that the host itself gets adequate nutrition for themselves and the baby. Beetroot juice are high in iron content (this is important for pregnancy because women tend to lose their iron counts during these 9 months) and other juices are a source of vitamins and minerals that will help give the baby essential vitamins A to D.

Mikhail Tombak, Ph.D., (2012) stated that Beet juice is a blood purifier, blood builder and helps in the creation of red blood cells. Beet juice improves blood structure and cures diseases of the circulatory system, large intestine and digestive system; Beets are very powerful cleansers of the liver and kidney, which help cleanse the circulatory system. Drinking fresh beet juice may help reverse your problems with anemia or other blood issues such as high cholesterol.

Anemia can be treated with early diagnosis and proper management. It has significant that consumption of beetroot extracts which effect on human blood and blood forming qualities due to its higher iron content.

Prevention is the better than cure early registration of antenatal women and proper intake of iron and dietary supplement reduce the risk of anaemia in pregnancy

Need for the Study

National family health survey (NFHS-3) conducted in 2005 -2006, presented the statistics that most of the anaemic patients, especially women, suffer from mild to severe deficiency of iron. As per the latest national family health survey, 55.3 percent of all women between 15-49 years of age, 56.2 percent of never married women and 58.7 per cent of pregnant women are anaemic in the country.

Khalafalla. A, Amanda E. Dennis (2012) stated that Nutritional iron-deficiency anaemia (IDA) is the most common disorder in the world, affecting more than two billion people. The World Health Organization's global database on anaemia has estimated a prevalence of 14% based on a regression-based analysis. Recent data show that the prevalence of IDA in pregnant women in industrialized countries is 17.4% while the incidence of IDA in developing countries increases significantly up to 56%. Although oral iron supplementation is widely used for the treatment of IDA, However, in recent years, new type II and III iron complexes have been developed, which offer better compliance and toleration as well as high efficacy with a good safety profile. In summary, intravenous iron can be used safely for a rapid repletion of iron stores and correction of anaemia during and after pregnancy.

Ellen Coleman (2012) explained that a diet rich in vegetables has health benefits. It's been proposed that these health effects may be due inadequate intake of vegetarian while iron is found in all vegetables; it's especially abundant in beetroot and leafy greens. Dietary iron lowers anaemia, that dietary iron supplementation in

the form of beetroot juice increase the haemoglobin level. Iron has numerous functions in the body, including the regulation of blood flow, muscle contractility, glucose and calcium homeostasis, and mitochondrial respiration.

Bhalerao. A (2011) conducted a study on anaemia during pregnancy relationship between maternal haemoglobin and perinatal outcomes. The sample used total 1200 women, and to highlight the importance of antenatal care to improve maternal health, maternal and foetal outcomes. The study reveals that out of 1200 women, 787 were anaemic (67.2%) <11gm of haemoglobin and 413 were non anaemic. The study concluded that regular patient education by imparting proper knowledge regarding iron-rich foods, food fortification, and implementation of anaemia prophylaxis programme, regular antenatal care from first trimester has a vital role in assessing and managing maternal anaemia timely.

Federation of Obstetrics and Gynecology of India (2011) mentioned that Maternal anaemia is associated with poor intrauterine growth and increased risk of preterm births and low birth weight rates. This is turn results in higher perinatal morbidity and mortality, and higher infant mortality rate. A doubling of low birth weight rate and 2 to 3 fold increase in the perinatal mortality rates is seen when the Hb is <8 g/dl. Parental height and maternal weight are determinants of intrauterine growth and birth weight. Thus maternal anaemia contributes to intergenerational cycle of poor growth in the offspring.

Vijaynath (2010) conducted a descriptive study to find out the prevalence of anaemia in pregnancy and to investigate cause of pregnancy in and around Raichur.

The sample consists of 185 pregnant mothers. By using questionnaires' method and assessing the haemoglobin level.6.48% only have knowledge and 93.5% are not having knowledge. The study shows that the prevalence of anaemia is high (88.64%). The knowledge about anaemia in pregnant women and complications occurring during pregnancy is very poor.

Kalaivani. K (2009) mentioned that Prevalence of anaemia in India is among the highest in the world. Prevalence of anaemia is higher among pregnant women and preschool children. Even among higher income educated segments of population about 50 per cent of children, adolescent girls and pregnant women are anaemic. Inadequate dietary iron, folate intake due to low vegetable consumption, perhaps low B12 intake and poor bioavailability of dietary iron from the fibre, phytate rich Indian diets are the major factors responsible for high prevalence of anaemia. Increased requirement of iron during growth and pregnancy and chronic blood loss contribute to higher prevalence in specific groups. In India, anaemia is directly or indirectly responsible for 40 per cent of maternal deaths. There is 8 to 10-fold increase in MMR when the Hb falls below 5 g/dl. Early detection and effective management of anaemia in pregnancy can contribute substantially to reduction in maternal mortality.

Ziaei. S, et al., (2008) conducted a study to measure levels of markers of anemia before and after delivery in women who had high hemoglobin levels during the early stage of the second trimester of pregnancy and did not receive iron supplementation during their pregnancies. In a randomized, double-blind, placebo-controlled trial 244 women who had a hemoglobin concentration of 13.2 g/dL or greater and a serum ferritin level higher than 15 microg/L between the 13th and 18th

week of pregnancy took either one 150-mg tablet of ferrous sulfate daily or placebo during their pregnancies. Markers of anemia were measured at the time of delivery and 6 weeks postpartum. The result was revealed that there were statistically significant differences between the 2 groups in hematocrit as well as hemoglobin and ferritin levels both at the time of delivery and 6 weeks postpartum ($P<0.05$), but these differences were not clinically significant. So not using iron supplementation did not cause a considerable decrease in markers of anemia in women with a hemoglobin concentration of 13.2 g/dL or greater in the second trimester of pregnancy.

Nahounou Bleyere. M, et.al., (2007) conducted a study ‘to appreciate the iron status during the pregnancy period (first, second and three trimesters) to realize an evaluation and to characterize the biological indicators of pregnant women. ’ Study was carried out in four medical and urban units of Abidjan in Côte-d'Ivoire with 531 pregnant women. The biological parameters significantly reduced in the third trimester of the pregnancy. But, an enhancement of the transferrin and the total iron binding capacity was observed. Moreover, 66 % of pregnant women presented iron deficiency anemia ($p < 0.01$). The researcher concluded that no pregnant woman presented iron normal status in the third trimester of the pregnancy.

A varied array of interventions exists that are designed to prevent and correct anaemia. These include dietary improvement, fortification of foods with iron, iron supplementation, and other public health measures. All of these approaches improve iron status in some contexts. The appropriate use of iron supplements will be an important part of anaemia control programs in almost all contexts, but supplements should be viewed as one of several tools in the battle against anaemia.

It emphasizes that anaemia is a commonly prevalent phenomena among the antenatal mothers. Based on the literature review, statistics, incidence of anaemia among antenatal women and the researcher's experience in the hospital, it is felt that beetroot extract iron rich may be beneficial for the antenatal mothers and help them in improving their level of haemoglobin and the level of well being.

Statement of the Problem

A Study to Assess the Effectiveness of Beetroot Extract on Reducing Anemia among Antenatal Mothers at Aravindan Hospital, Coimbatore.

Objectives

- To monitor the haemoglobin level among the antenatal mothers in the experimental and control group.
- To administer the beetroot extract for experimental group among antenatal mothers along with iron supplement
- To remonitor the haemoglobin level among antenatal mothers of experimental and control group.
- To compare the level of haemoglobin before and after administration of beetroot extract among antenatal mothers in the experimental group.
- To findout the association between the level of haemoglobin with demographic variable among antenatal mothers.

Hypothesis

H_1 : There will be significant difference between the level of Haemoglobin before and after the administration of Beetroot extract among antenatal mothers.

Operational Definitions

Effectiveness

It refers to the expected outcome. In this study it refers to the desired effects achieved by beetroot extract on improving the hemoglobin level, among antenatal mothers as a result of the intervention.

Anaemia

It refers when there is an inadequate amount of RBC caused by lack of iron in healthy antenatal mothers. When haemoglobin below the range of 11mg/dl.

Antenatal Mother

It refers mother who are in pregnancy state with irrespective of their parity and crossed first trimester of pregnancy.

Beetroot Extract

Beetroot extract was prepared by cutting 100gm of fresh beetroot into small piece and grind.50 ml of beetroot extract was mixed with 50ml of water and 15gm of jaggery.100 ml of beetroot extract was given to each antenatal mother for 20 days.

Assumptions

- Anaemia is prevalent during pregnancy.
- Degree of anaemia will vary from one mother to another.
- The level of Haemoglobin is an indicator of anaemia.
- Dietary intake of iron supplement in the form of beetroot extract will improve the level of Hemoglobin among antenatal mothers.

CHAPTER - II

Review of Literature

Review of literature is a broad, comprehensive, in-depth, systematic and critical review scholarly publication, unpublished, scholarly print material and audio visual material and personal communication.

A review of literature is an essential step in research project. if provides basis for future investigation, justifies the need for the study, throws, light on the feasibility of the study, reveals constrains of data collection and relates the findings from one study to another with a hope to establish a comprehensive study of scientific knowledge in a professional discipline, from which valid and pertinent theories may be developed.

The investigator did an extensive review of the research and non research literature related to present study and made an attempt through pub med search which contributed to the new knowledge

The Literature Review Related to the Present Study is Organized Under the Following Headings Accordingly

- Review of literature related to the prevalence of anaemia among antenatal mothers
- Review of literature related to the effectiveness of beetroot extract in reducing anaemia

Literature Related to the Prevalence of Anaemia Among Antenatal Mothers

Chanthurani. U et.al., (2012) conducted a study on the prevalence of anaemia during pregnancy among 990 antenatal mothers in Anuradhapura district, srilanka. Serumhaemoglobin was measured using sahils haemoglobinometer. Clinical examination was carried out to evaluate the conjunctiva for anaemic mothers. The result reported that, In the first, second and third trimesters, prevalence of anaemia was 7.6%, 19.7% and 19.3% and Gestational age adjusted anaemia prevalence among pregnant women in this study population was 14.1%.

Pushpa. O. Lokare, et.al., (2012) conducted a descriptive study on the prevalence of anemia and the various socio demographic factors associated with anemia among antenatal mothers at an urban health center in Aurangabad city, India. A total of 352 antenatal mothers were selected using a systematic random sampling technique and Chi-square test is used. Overall prevalence of anemia among the pregnant women was found to be 87.21% and the low socioeconomic class, illiteracy, Hindu religion were significantly associated with high prevalence of anemia during pregnancy in Indian women.

Dapos (2012) conducted a cross-sectional study carried out in a primary health centre at Nigeria among 277 antenatal mothers whose age ranged from 16-40 years. Anaemia was observed to be least prevalent in women within the extremes of reproductive age (≤ 20 years and 36–40years) Association between variables was analyzed using the Chi-square test. There was no statistically significant association between age, educational level and marital status ($p > 0.05$). The association of anaemia with social class was statistically significant ($p = 0.000$). Out of all the socio-

demographic characteristics, the socio-economic status of women should be enhanced in line with the Millennium Development Goals to prevent anaemia and to enhance pregnancy outcomes.

Pallavi. R. shidhave, et.al., (2012) conducted a cross-sectional study was carried out in the antenatal ward of Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai. A total of 408 women were included and a pre-designed and pre-tested questionnaire was used for the study. In the present study, 312 (76.5%) women were found anaemia. Only 72 (25.5%) had more than three ANC visits during the pregnancy. About 234 (57.4%) received iron and folic acid (IFA) tablets, while 174 (42.6%) didn't receive and. the significant of prevalence of anemia among antenatal mother need to promote, educate, and increase the awareness.

Ndiaye. M, et.al., (2011) conducted a cross-sectional study among 371 pregnant women. It was to measure the impact of a positive deviance approach to improve an iron-supplementation program among pregnant women in a rural Senegalese area. Positive deviances approach (PD Micah) and the pre-post evaluation was conducted and socio-demographic questionnaires and anthropometric measurements were performed. The result showed that, After 9 months of activities, the mean hemoglobin level rose from 93.9 to 100.7 g/L in the PD Micah group. No significant change was observed in the Micah group. Logistic regression analysis showed a significantly reduced risk of anemia in the PD Micah area. The researcher concluded that the positive deviance approach, can contribute to improving the effectiveness of iron supplementation during pregnancy.

A. odekunle, et.al., (2010) conducted a retrospective and cross-sectional study among 2287 antenatal mothers to determine the prevalence of anaemia at 40 public healthcare centres in Trinidad and Tobago Data pertaining to the investigated variables were recorded. By using chi-square tests, odds ratios and logistic regression to assess the relationship between anaemia and each variable. The prevalence of anaemia was 15.3% among antenatal mothers (95% CI 13.4%, 16.6%). No significant difference in the prevalence of anaemia was found among the different clinics

Ahmad. N (2010) conducted a study in the Maternity Clinic of Pravara Rural Hospital (PRH), Loni, Ahmednagar, and Maharashtra, India. Only pregnant women who were 12-20 weeks of gestation were eligible for inclusion. The diagnosis of anaemia was undertaken using the standard peripheral blood smear examination. Participants were interviewed using a pre- structured, pre-tested questionnaire.310 subjects were enrolled, of whom 232 (74.8%) were found to be anaemic. The majority (50.9%) demonstrated moderate anaemia while mild and severe anaemia were recorded in 70 (30.17%) and 44 (18.9%) respectively. A highly significant association was found Very high prevalence of anaemia (74.8%) early in pregnancy is an indicator of the failure of WHO and national programmes aimed at reducing anaemia in this group. Those pregnant for the first time are at greatest risk of developing anaemia

Hong Yan, et.al., (2009)conducted a hospital-based study was in 380 pregnant women at Lhasa, Tibet. Their blood samples were tested and related socio demographic information was collected. Regression model were used to assess the association of pregnant women's characteristics with hemoglobin level and the

occurrence of anemia. The mean hemoglobin concentration was 127.6 g/L (range: 55.0-190.0 g/L). Prevalence rate of anemia in this study was 70.0%, 77.9% and 41.3%, respectively for three altitude-correction methods for hemoglobin (Centers for Disease Control CDC method, Dirren, et.al., method and Dallman, et.al., method). Specially, the hemoglobin concentration of pregnant women decreased with increase in gestational age. Gestational age, ethnicity, residence and income were found to be significantly associated with the hemoglobin level and the occurrence of anemia in the study population.

Noron. J. A, Bhadaui. A, et.al., (2008) conducted a study to identify the prevalence of anaemia among pregnant women attending antenatal care units of selected hospitals of Udupi district. The sample used is 1, 077 pregnant women were screened for anaemic using cyanmethaemoglobian method, during the first antenatal visit. The prevalence of anaemia was found to be 50.14% which is nearly equivalent to the prevalence rate reported in the literature for Karnataka. Findings of the study revealed that the prevalence was higher among young women, women belonging to low socioeconomic status and women with short pregnancy intervals and higher parity. Study suggests implementing various preventive strategies, especially advocacy and monitoring of the iron and folic acid supplementation

National Nutritional Anaemia Prophylaxis Programme (2007) proposed that double fortified salts or sprinkles of ultra rice and other micronutrient or fortified candidates should be explored as an adjunct or alternate supplementation strategy for anaemia prevention.

Jiany. T, Christian. P, et.al., (2005) stated that pregnant women are more prone to nutritional deficiency because of increased metabolic demands imposed by pregnancy due to growing placenta, fetus and maternal tissues together with associated dietary risks deficiencies.

Literature Related to the Effectiveness of Beetroot Extract in Reducing Anemia

Justine Butler, Senior Health Campaigner (2012) conducted an experimental study to assess the effectiveness of Beetroot extract in reducing anaemia at Washington. In which 105 adolescents were selected as samples by random sampling method and Blood samples were collected from them, before and after the intervention. Beetroot extract was given once in a day for 25 days. The result showed that 76% of adolescents were anemic before the treatment. There was significant improvement in the haemoglobin level (82%). He concludes that Vegetarians have to take higher quality of iron rich foods in higher quantity and beetroot has a significant positive impact on the iron storage in the human body.

Gill. A. M (2011) pointed that the antenatal diet, also called the prenatal diet, is vitally important for the health and welfare of baby in utero. A proper diet should promote optimum health and nutrition in the mother to prepare her for delivery and for nursing after the baby is born. The iron rich foods are liver, meat, egg, beetroot, green vegetables, green peas, beans and jaggery.

Neogenis (2011) conducted a study by the University of Texas (UT) suggests that a dietary supplement containing beetroot and hawthorn beery may boost heart health and reduce anaemia. Beetroot were selected for study because it contains high

levels of iron and dilates the blood vessels. It include 30 participants, all above the age of 40, were randomly assigned to consume beetroot juice for 30 days. After 30 days of therapy, the herb supplement group had significant increases in iron levels, as compared to the placebo group, 72 percent of the individuals in the herbal supplement group experienced statistically significant reduction of anaemia and raise in heamoglobin.

Nebrask (2011) conducted a experimental study among the pregnant mothers. Iron Rich Vegetables on the effectiveness of beetroot juice consumption in reducing anemia. Study was designed to show that beetroot juice increases the blood forming qualities. Due to its higher concentration of iron, it regenerates and reactivates the red blood cells. One serving of beetroot juice was given for 2 weeks, to the experimental group. After beetroot juice intake, there was a significant improvement in the haemoglobin level (82%) for the experimental group.

Wirani Garner (2011) a natural study conducted home remedies for treat anaemia**.** A cup of beetroot juice mixed with honey each day is a good way to fight anemia. Beetroot is a very powerful agent when it comes to increasing hemoglobin in the blood.

Paul Fassa (2011) conducted study beets help cleanse the blood and create more red blood cells. They are useful for treating and curing anaemia. Red beet and their leaves are a high source of folate, which is the natural base of folic acid. Folate helps build tissue and red blood cells. Folic acid from folate is more beneficial for pregnant women.

Rita. L. Ailinger, et.al., (2011) conducted a study to examine drinking beetroot juice in anaemia among Nicaraguan women. A qualitative design was used. The findings indicate that few of the women had biometrically accurate concepts of anemia, such as that it was due to lack of iron from poor eating. Others held folk medical beliefs including home remedies drinking the beet juice and eating certain foods such as bean soup. It has the significant positive impact to increase iron.

Bakhru. H. K (2010) explained that Nutrient-rich beet juice contains high levels of iron that binds oxygen to red blood cells, and supplies the body with oxygen. Beet juice is particularly beneficial as a anemia remedy for children, teenagers and pregnancy. according to naturopath, author of "Foods That Heal. "

Fsaumi (2008) conducted an experimental study among 20 malnourished adolescent girls in the age group of 12 – 16 years who were divided into two groups, 10 as experimental and 10 as control. The girls of the experimental group were given nutritional supplement beetroot (50gm | day) for a period of 25 days and the control group was given placebo for the same period. Diet pattern was same for all the 20 subjects. Result showed that there was an increase in the serum haemoglobin level (72%) and folic acid (68%) level in the experimental group after the administration of beetroot supplementation (m=10.31, SD=1.32146) irrespective of their demographic variables. It is concluded that the increase in serum haemoglobin levels irrespective of their demographic variables in the experimental group as compared to control group was definitely due to the effect of beetroot.

Viadel, et.al., (2008) conducted a study on the effectiveness of uncooked beetroot's iron content and absorption compared with the synthetic iron content absorption. The study revealed that along with every iron rich food it is essential to take vitamin 'c' for rapid absorption. Hence in beetroot vitamin 'c' components are already present. Compared with synthetic iron content absorption (r = 0.032), uncooked beetroot has natural source of iron and vitamin 'c' has faster absorption. So the absorption of iron in beetroot is easier to get absorbed than the synthetic iron content.

Conceptual Framework

Conceptual framework is a theoretical approach to the study of the problem that are scientifically based and emphasis the selection, arrangement and classification of the concepts.

Falbot (1995) stated that a conceptual framework is a network of inter-related chances that provide a structure for organising and describing the phenomenon of interest. Research studies are based on the theoretical or conceptual framework that facilitates visualizing the problem and places the variables in a logical context.

The conceptual framework for the present study is based on prescriptive theory by Ernestine Wiedenbach helping art of clinical nursing midwifery practice (1964).

According to Wiedenbach's nursing practice consist of (identification) identify the clients need for health, (ministration) ministering the needed help and (validation) validating that the need for help was met.

According to Wiedenbach, nursing is an art based on goal directed care. It consists of 3 steps:

- Step 1 : Identifying the need for help
- Step 2 : Ministering the need for help
- Step 3 : Validating the need for help

Step 1: Identifying the Need for Help

Identification determines a client need for based on the existence of a need, whether the client realize the need. Here identified the selected variables of antenatal mothers. It includes the following components.

a) General Information

This comprises of the demographic variables which includes age, education, type of family, occupation, monthly income of the family, diet pattern, gestational age, number of gestation, birth space and number of abortion.

b) Central Purpose

Central purpose is to reduce anaemia among antenatal mothers.

c) Prescription

It includes nursing intervention prescribed to meet the central purpose that is beetroot extract reducing anaemia among antenatal mothers.

Step 2: Ministering the Need for Help

It refers to provision of needed help. Here the midwife formulates a plan and which the antenatal mothers accepts and implement the plan. This includes one component called reality beetroot extract is effective on reducing anaemia. This reality has four components.

a) Agent

The midwife act as an agent to render the needed help.

b) Recipient

The women who fulfill the inclusion and exclusion criteria will be accepted as recipient needing help.

c) Goal

The goal is to reduce anaemia among antenatal mothers.

d) Means

Means are the activities and devices used by nurse to achieve the goal. Here the midwife investigator implemented beetroot extract during antenatal period.

e) Framework

It refers to the facilities in which nursing care is provided. Here the framework was Aravindan hospital, Coimbatore

Step 3: Validating Need for Help was Met

Validation refers to collection of evidence that shows clients needs have been met its functional activity has been restored as a direct results of midwife action. Validation means assessing the outcome of ministering the needed help. This involves the post assessment level of haemoglobin among antenatal mothers. Statistically proved that beetroot extract is effective on reducing anaemia among antenatal mothers.

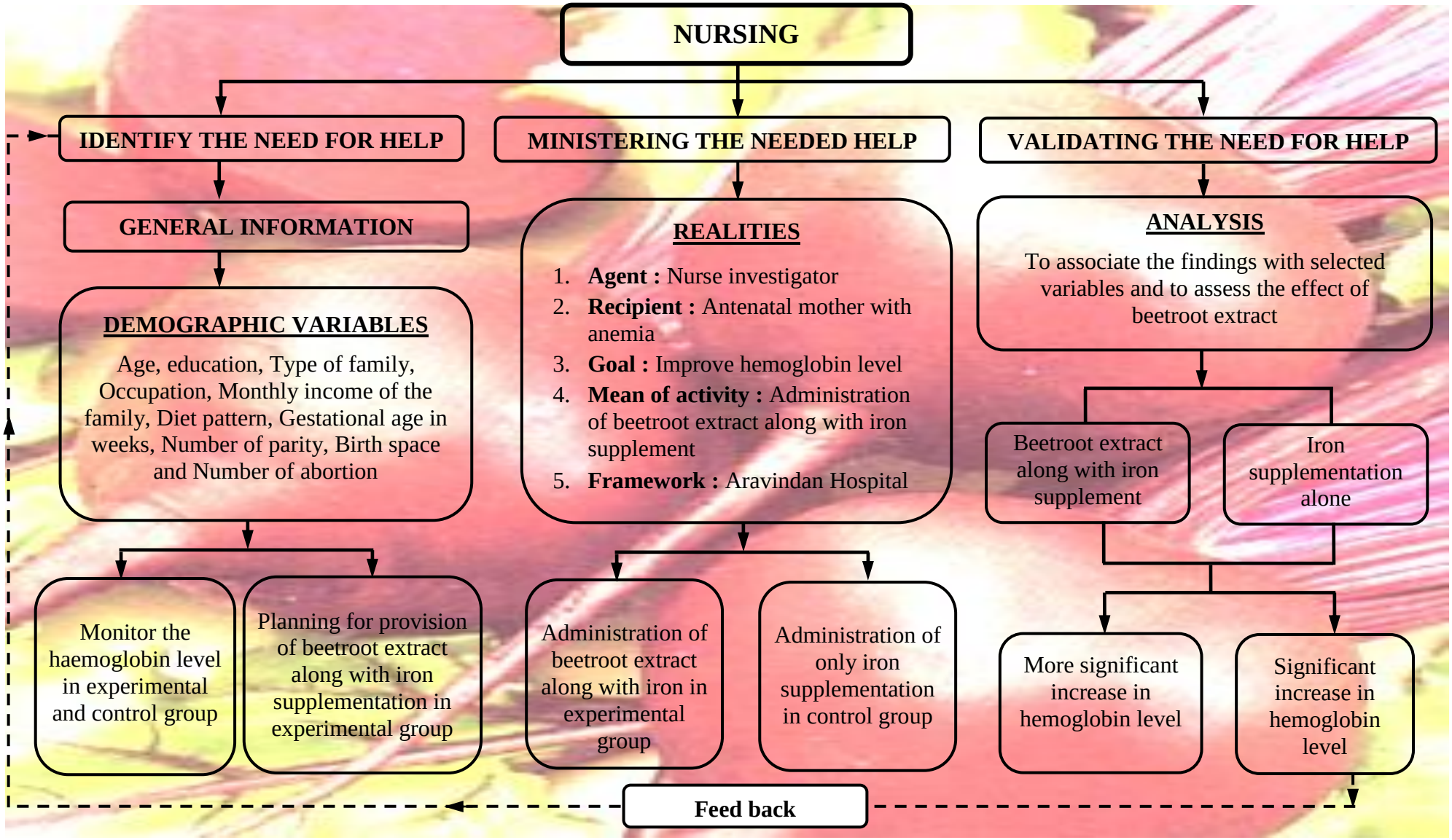

Figure. 1 Modified Conceptual Framework Based on Ernestine Wiedenbach's Helping Art of Clinical Nursing Theory (1964)

CHAPTER - III

Methodology

Methodology of the study indicates the general pattern of the research approach and research design that indicates the steps of procedures and strategies and analyzing the data in the investigation.

Kothari (1990) states that research methodology is a way to solve the research problems systematically. It includes research approach, research design, setting of the study, population, sample size, sampling techniques, criteria for the selection of sample, description of the tool, variables under study, procedure of data collection, statistical techniques used to analyze the data with logical reasons with it.

Research Approach

An experimental approach, a sub type of quantitative approach was selected to assess the effectiveness of beetroot extract on reducing anaemia among antenatal mothers at Aravindan Hospital, Coimbatore.

Research Design

The research design provides an overall plan for conducting the study. Quasi-experimental pre- test post test control group design was adopted for the present study.

E	Q_1	X	Q_2
C	Q_1	--	Q_2

E - Experimental group

C - Control group

Q_1 - Pre test assessment of anaemia

X - Intervention (Beetroot Juice)

Q_2 - Post test assessment of anaemia

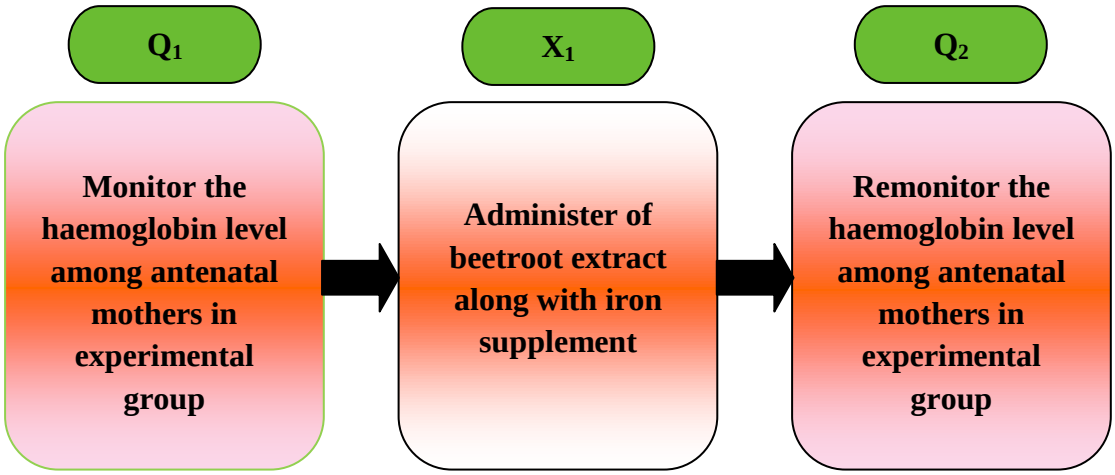

Figure. 2 The Schematic Representation of the Study Design of Experimental Group

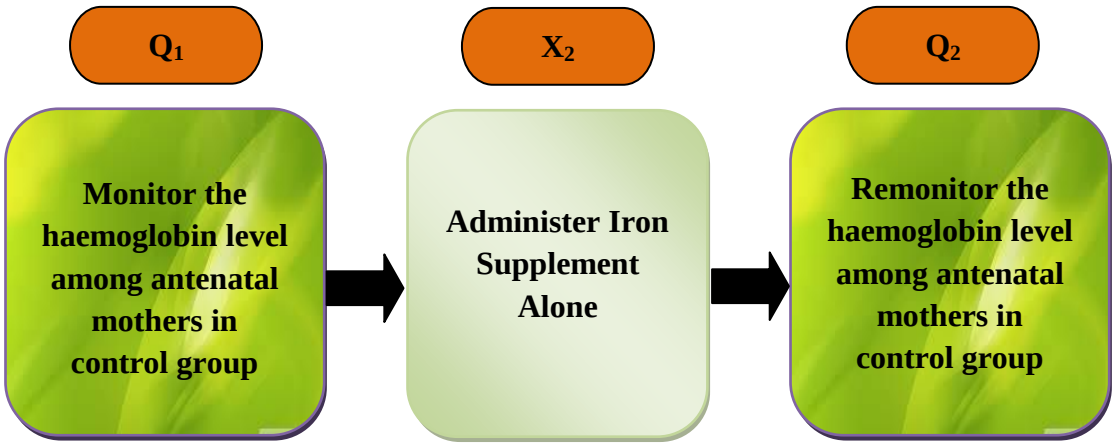

Figure. 3 The Schematic Representation of the Study Design of Control Group

Setting of the study

The study was conducted among antenatal mothers in Aravindan Hospital, Kovilpalayam, Coimbatore, which is situated 5 km away from PPG College of Nursing. It is a 250 bedded multi specialty hospital.

Variables

Independent variable was Beetroot extract. Dependant variable was level of haemoglobin among antenatal mothers. Influencing variable were age, education, type of family, occupation, monthly income of the family, diet pattern, gestational age, number of parity, birth space and number of abortion

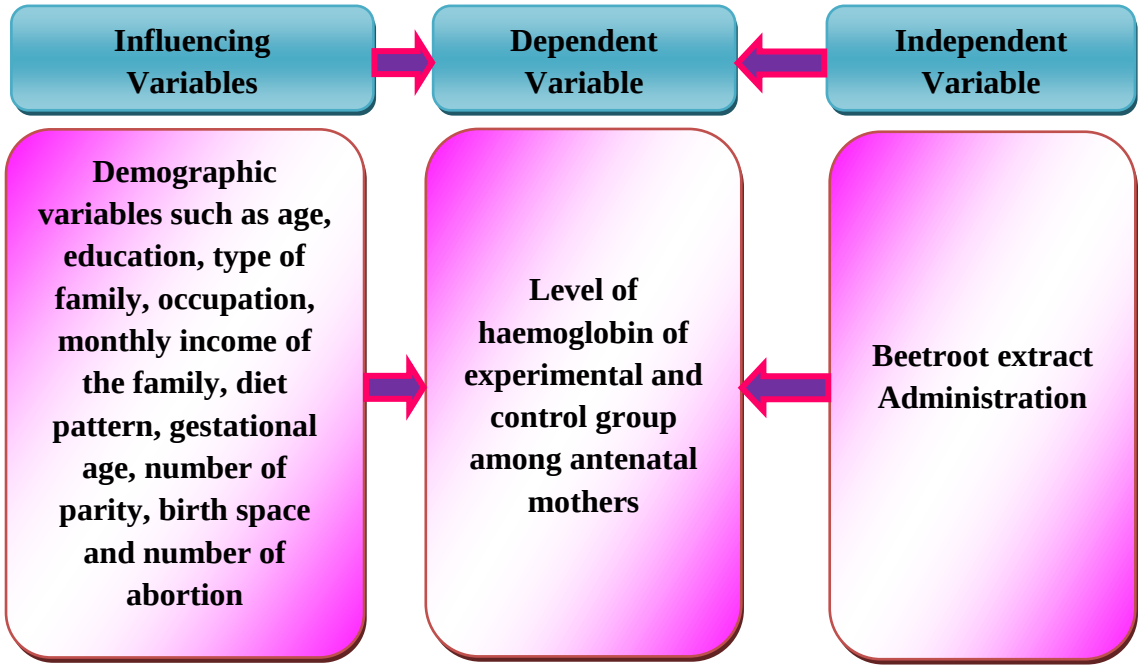

Figure. 4 The Schematic Representation of the Variables

Population

The population of the study includes antenatal mothers having haemoglobin level less than 11 mg/dl who fulfilled the eligibility criteria from the Aravindan hospital at the time of the study.

Sample Size

The sample size of the present study was 40 antenatal mother residing in kovilpalayam, out of which 20 samples belongs to experimental group and 20 samples belongs to control group.

Sampling Technique

Non-probability convenient sampling technique was used for selecting the samples.

Criteria for Sample Selection

Inclusive Criteria

- Both primigravida and multigravida
- Antenatal mothers who were attending the clinical visit at aravindan, kovilpalayam
- Antenatal mothers who were willing to participate in the study
- Antenatal mothers who have haemoglobin below 11gm/dl

Exclusive Criteria

- Antenatal mothers who had haemoglobin level is more than 10.9 mg/dl and less than 7mg/dl.
- Antenatal mothers who had diabetic in pregnancy.
- Antenatal mothers who are at high risk
- Antenatal mothers who are not available during the period of data collection
- Antenatal mothers who are not willing to participate in the study
- Antenatal mothers who participate in pilot study

Description of the Tool

The researcher had developed a tool after reviewing the literature to assess the level of haemoglobin. It has the following sections

Section - A Distribution of Demographic Variables

It consists of demographic data seeking information about age, education, type of family, occupation, monthly income of the family, diet pattern, gestational age in week, number of parity, birth space and number of abortion.

Section - B Sahli's Haemoglobinometer

It is proposed in 1902 by Swiss scientist H. Sahil. It's an instrument used to determine the quantity of haemglobin in blood. It's based on comparison of colour of tested blood, which is treated with HCL solution and add distall water untill it matches the colour of standard tube.

Score Interpretation for Assessing Haemoglobin Level

According to WHO classification the level of haemoglobin was classified as below.

10-10.9mg/dl	Mild anaemia
7-9.9mg/dl	Moderate anaemia
< 7 mg/dl	Severe anaemia

Testing of the Tool

Content Validity

The tool was given to 5 experts in the field of obstertrics and gynecology nursing and medicine for content validity. All comments and suggestions given by the experts were duly considered and corrections were made after discussion with research guide.

Reliability of the Instrument

The tool is highly reliable because the scale used was standard. The reliability of the tool was obtained by spearman split half technique. The reliability ‘r’ value was 0.9795. Hence the reliability of the tool was satisfactory.

Pilot Study

Pilot study is a trial run for major study to test the reliability, practicability, appropriateness and flexibility of the study and the tool

In order to test the relevance and practicability of the study, a pilot study was conducted among 4 antenatal mothers. (2 in experimental group and 2 in control group) residing at Kovilpalayam in Aravindan Hospital, Coimbatore. After getting permission from the medical director, Pretest was conducted from both experimental and control group using Sahli’s Haemoglobinometer. After the pretest beetroot extract was given for the experimental group for one week. Post test was conducted by using same tool for both the group. The pilot study report showed that there was increase in haemoglobin level in experimental group than the control group. The result showed that the tool was appropriate and feasible to conduct the study.

Data Collection Procedure

Formal permission was obtained from the honorable medical director of Aravindan hospital, Kovilpalayam to conduct the study. Nature, purpose and duration of the study was explained to the samples and obtained their oral and written consent. Necessary precautions were taken to provide privacy and confidentiality. The study was conducted for a period of 30 days from 01.01.2014to 31.01.2014. The samples

were selected by using non probability convenient sampling technique on the basis of selection criteria. Among 40 samples, 20 samples were considered as experimental group and 20 samples were considered as control group.

After the investigator collected the demographic data from the samples. Then the investigator assessed the haemoglobin level (pretest) in experimental group and control group by using Sahli's haemoglobinometer. Then 100ml of beetroot extract was given to the experimental group for continuous 30 days. In post test on 30th day, haemoglobin level was assessed for experimental and control group by using the same Sahli's haemoglobinometer.

Plan for Data Analysis

Data was analyzed by using descriptive and inferential statistics. Demographic variables were analyzed by using frequency and percentage distribution. Paired 't' test was used to assess the effectiveness of beetroot extract on reducting anaemia among antenatal mothers. Chi-square test was used to find out association of demographic variables among antenatal mothers.

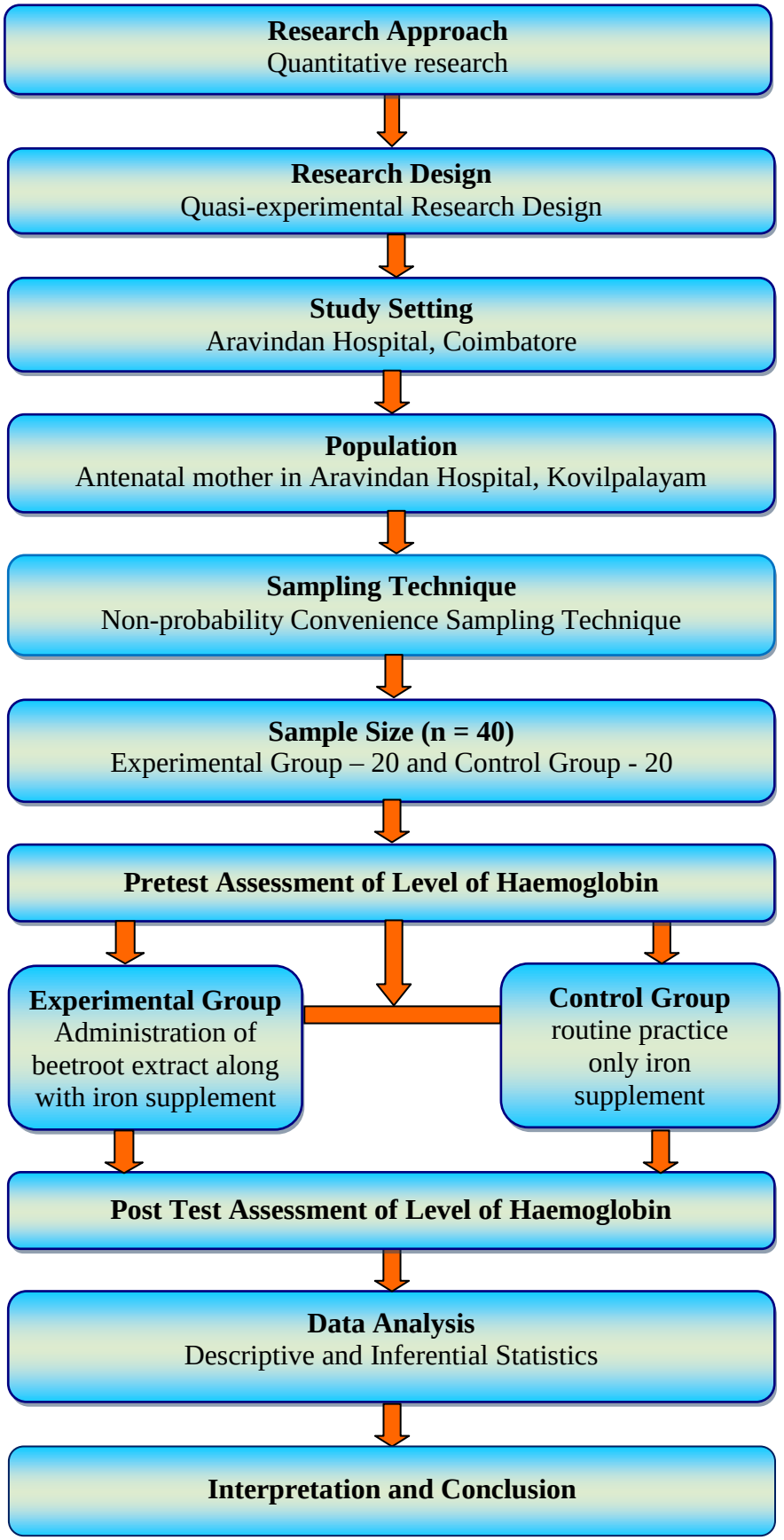

Figure. 5 The Overall View of Research Methodology

CHAPTER - IV

Data Analysis and Interpretation

This chapter deals with analysis and interpretation of the data collected from antenatal mothers at Aravindan hospital in kovilpalayam, Coimbatore, to assess the effectiveness of beetroot extract reducing anaemia among antenatal mothers. The findings of the study are based on the descriptive and inferential statistical analysis was presented under the following heading.

Section – I : Distribution of demographic variables of antenatal mothers in experimental group and control group at Aravindan Hospital, Coimbatore.

Section – II : Distribution of statistical values of pretest scores on level of haemoglobin among antenatal mothers of experimental and control group at Aravindan Hospital, Coimbatore.

Section – III : Distribution of statistical values of pretest and post test scores on level of haemoglobin among antenatal mothers of experimental group at Aravindan Hospital, Coimbatore.

Section – IV : Distribution of statistical values of pretest and post test scores on level of haemoglobin among antenatal mothers of control group at Aravindan Hospital, Coimbatore.

Section – V : Distribution of statistical values of post test scores on level of haemoglobin among antenatal mothers of experimental and control group at Aravindan Hospital, Coimbatore.

Section – VI : Association of haemoglobin level with selected demographic variables among antenatal mothers at Aravindan Hospital, Coimbatore.

SECTION – I

Table. 1. Distribution of Demographic Variables of Antenatal Mothers in Experimental Group and Control Group at Aravindan Hospital, Coimbatore

(n = 40)

S. No.	Demographic Variables	Control Group (n = 20)		Experimental Group (n = 20)	
		f	%	f	%
1.	**Age in years**				
	a) 20-24 years	10	50	8	40
	b) 25-29 years	10	50	12	60
	c) 30-34 years	0	0	0	0
	d) Above 35 years	0	0	0	0
2.	**Education status of the mother**				
	a) Illiterate	9	15	3	15
	b) Secondary school	9	45	5	25
	c) Higher secondary school	3	15	9	45
	d) Degree	5	25	3	15
3.	**Type of family**				
	a) Nuclear	10	50	9	45
	b) Joint family	10	50	11	55
	c) Extended family	0	0	0	0
4.	**Occupation of the mother**				
	a) House wife	9	45	15	75
	b) Daily wages	5	25	2	10
	c) Government employee	0	0	0	0
	d) Private employee	6	30	3	15

(Table 1 continues)

(Table 1 continued)

S. No.	Demographic Variables	Control Group (n = 20)		Experimental Group (n = 20)	
		f	%	f	%
5.	**Monthly Income**				
	a) ₹.5000-6000	2	10	0	0
	b) ₹.6001-8000	3	15	5	25
	c) ₹.8001-10, 000	8	40	11	55
	d) Above 10, 000	7	35	4	20
6.	**Diet pattern**				
	a) Vegetarian	4	20	7	35
	b) Non vegetarian	16	80	13	65
7.	**Gestational weeks**				
	a) 1-12 weeks	3	15	3	15
	b) 13-27 weeks	15	75	13	65
	c) 28-32 weeks	2	10	4	20
8.	**Number of parity**				
	a) 1st time	8	40	8	40
	b) 2nd time	11	55	12	60
	c) 3rd time	1	5	0	0
9.	**Birth space**				
	a) <18 months	0	0	0	0
	b) 18-35 months	4	20	9	45
	c) >36 months	9	45	3	15
	d) First gestation	7	35	8	40
10.	**Number of abortion**				
	a) 0	15	75	15	75
	b) 1	5	25	5	25
	c) 2	0	0	0	0

Table.1 Shows the description of demographic variables of antenatal mothers in control group and experimental group

Among the respondents, in control group 10(50%) mothers were between the age group of 20-24years, 10(50%) mothers were between the age group of 25-29 years. As in experimental group 8 (40%) mothers were between the age group of 20-24 years, 12 (60%) mothers were between the age group of 25-29 years.

About education status of the mother, 3(15) mothers were illiterate, 9 (45%) have undergone secondary education, 3(15%) mothers had higher secondary, 5(25%) mothers had degree in control group. Where as in experimental group3 (15%) mothers were illiterate, 5 (25%) mothers have undergone secondary education, 9(45%) mothers had higher secondary education, 3 (15%) mothers had degree level.

Regarding type of family, 10 (50%) mothers were from nuclear family and 10(50%) mothers were from joint family in control group. Where as in experimental group 9(45%) mothers were from nuclear family and 11(55%) mothers were from joint family.

While considering occupation 9(45%) mothers were housewife, 5 (25%) mothers were daily wages, and 6 (30%) mothers were private employee in control group. Where as in experimental group 15 (75%) mothers were housewife, 2 (10%) mothers were daily wages, 3(15%) mothers were private employee.

About the monthly income of the family 2(10%) were between ₹ 5000-6000, 3 (15%) were between ₹.6001 – 8000, 8(40%) were between ₹ 8001-10000, 7(35%)

were between above ₹10, 000 in control group, 5 (25%) were between ₹.6001-8000, 11(55%) were between ₹ 8001-10000, 4(20%) were between above ₹10000 in experimental group.

In relation to diet pattern 4 (20%) mothers were vegetarian, and 16(80%) mothers were non - vegetarian in control group, 7(35%) mothers were vegetarian and 13(65%) mothers were non vegetarian in experimental group.

Based on gestational weeks 3 (15%) mothers were 1-12 weeks, 15 (75%) mothers were 13-27 weeks, 2(10%) mothers were 28-32 weeks in control group. Where as in experimental group 3(15%) mothers were 1-12 weeks, 13(65%) mothers were 13-27, 4 (20%) were 28-32 weeks.

Regarding parity 8 (40%) mothers were 1st time, 11 (55%) mothers were 2nd time and 1(5%)mothers were 3rd time in control group, Where as in experimental group 8 (40%) mothers were 1st time, 12 (60%) mothers were 2nd time.

With regard to birth space 4(20%) mothers were 18-35 months, 9(45%) mothers were > 36 months, 7(35%) mothers were first gestation in control group. Where as in experimental group 9(45%) mothers were 18-35 months, 3(15%) mothers were > 36 months 8(40%) mothers were first gestation.

In consideration of number of abortion 15(75%) mothers have not undergone any abortion, 5(25%) mothers were 1 abortion in control group. Where as in experimental group 15(75%) mothers have not undergone any abortion, 5(25%) mothers were 1 abortion.

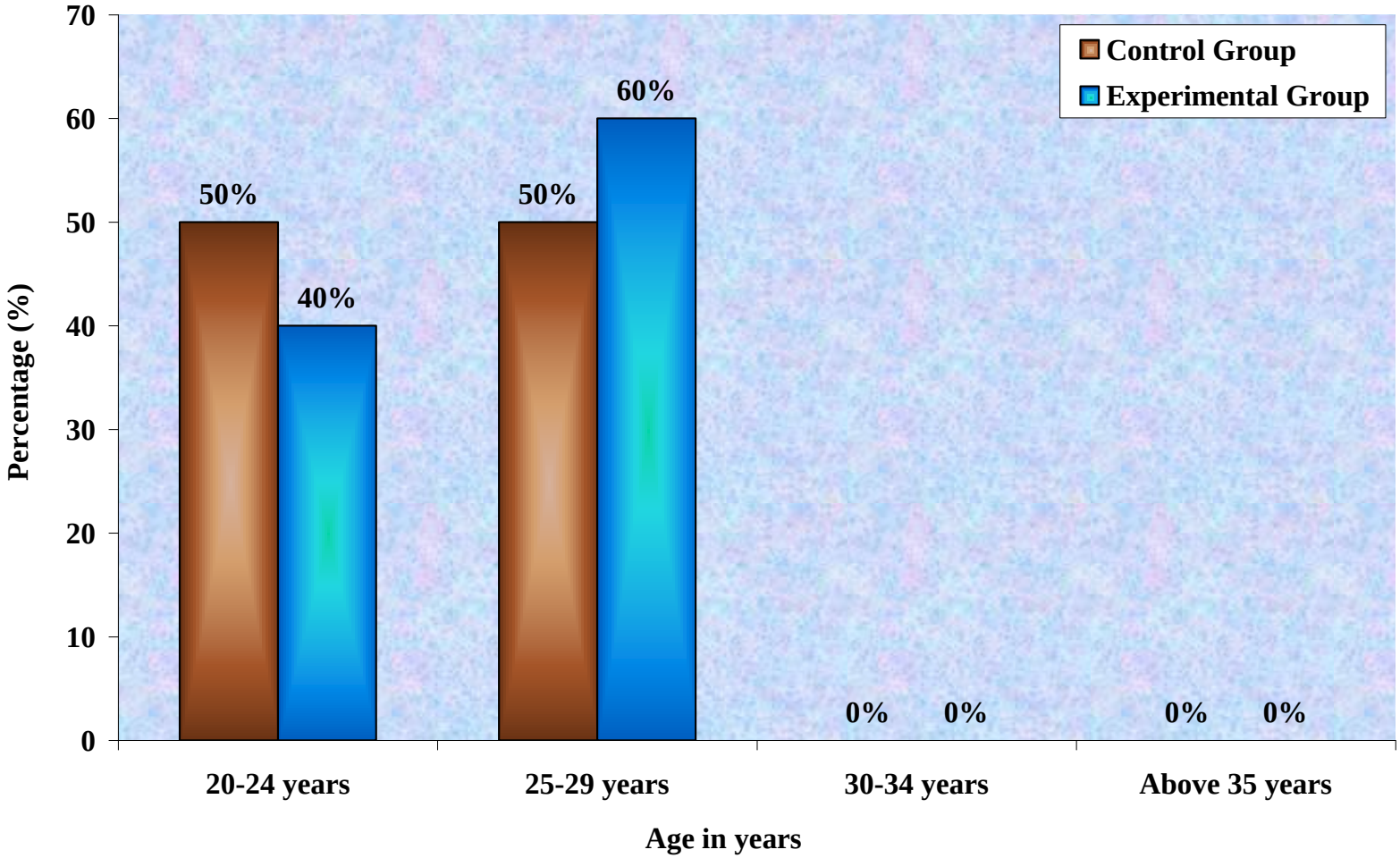

Figure. 6 Graphical Representation of Demographic Variables According to the Age of Antenatal Mothers in Control Group and Experimental Group

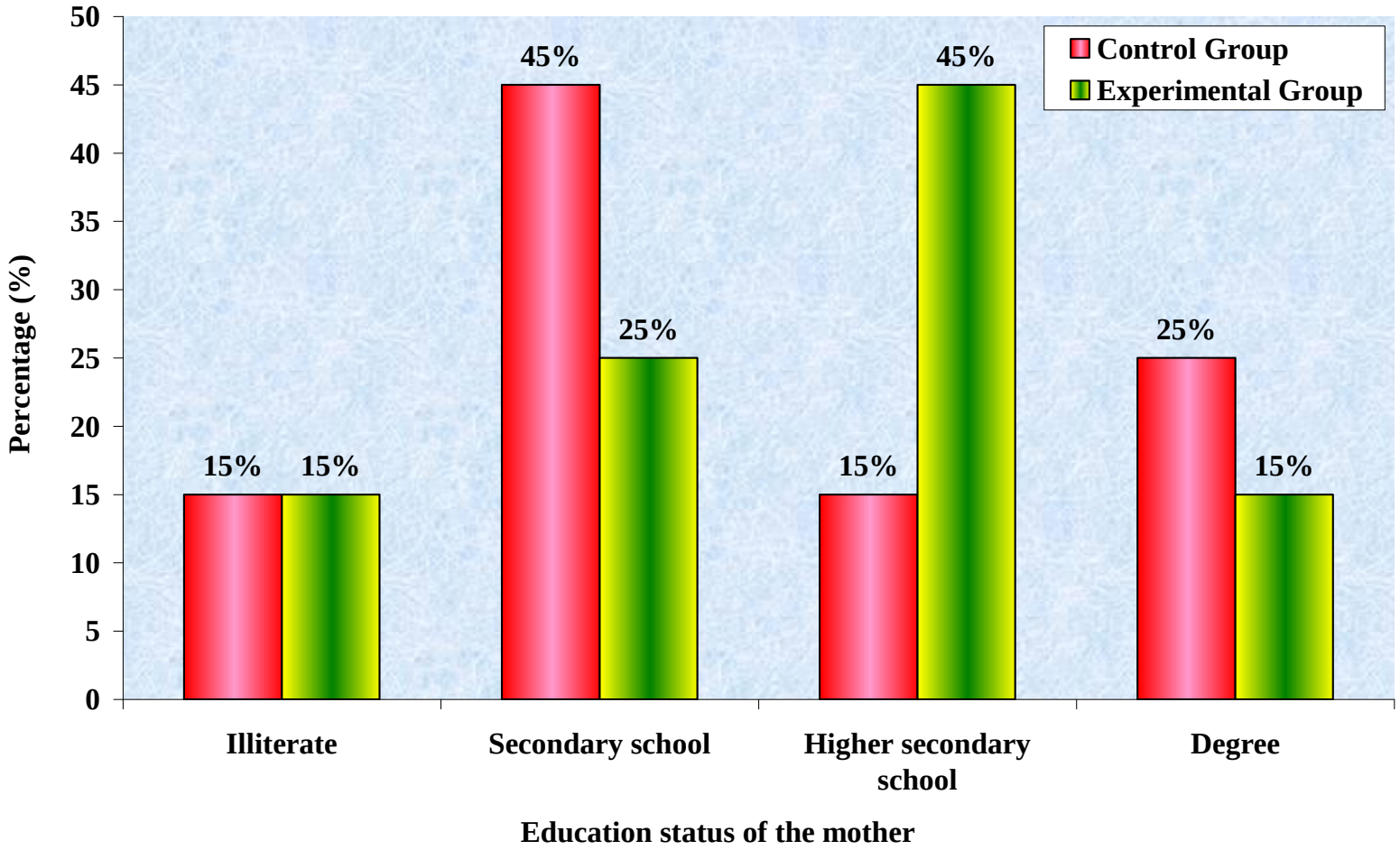

Figure. 7 Graphical Representation of Demographic Variables According to the Educational Status of the Mothers in Control Group and Experimental Group

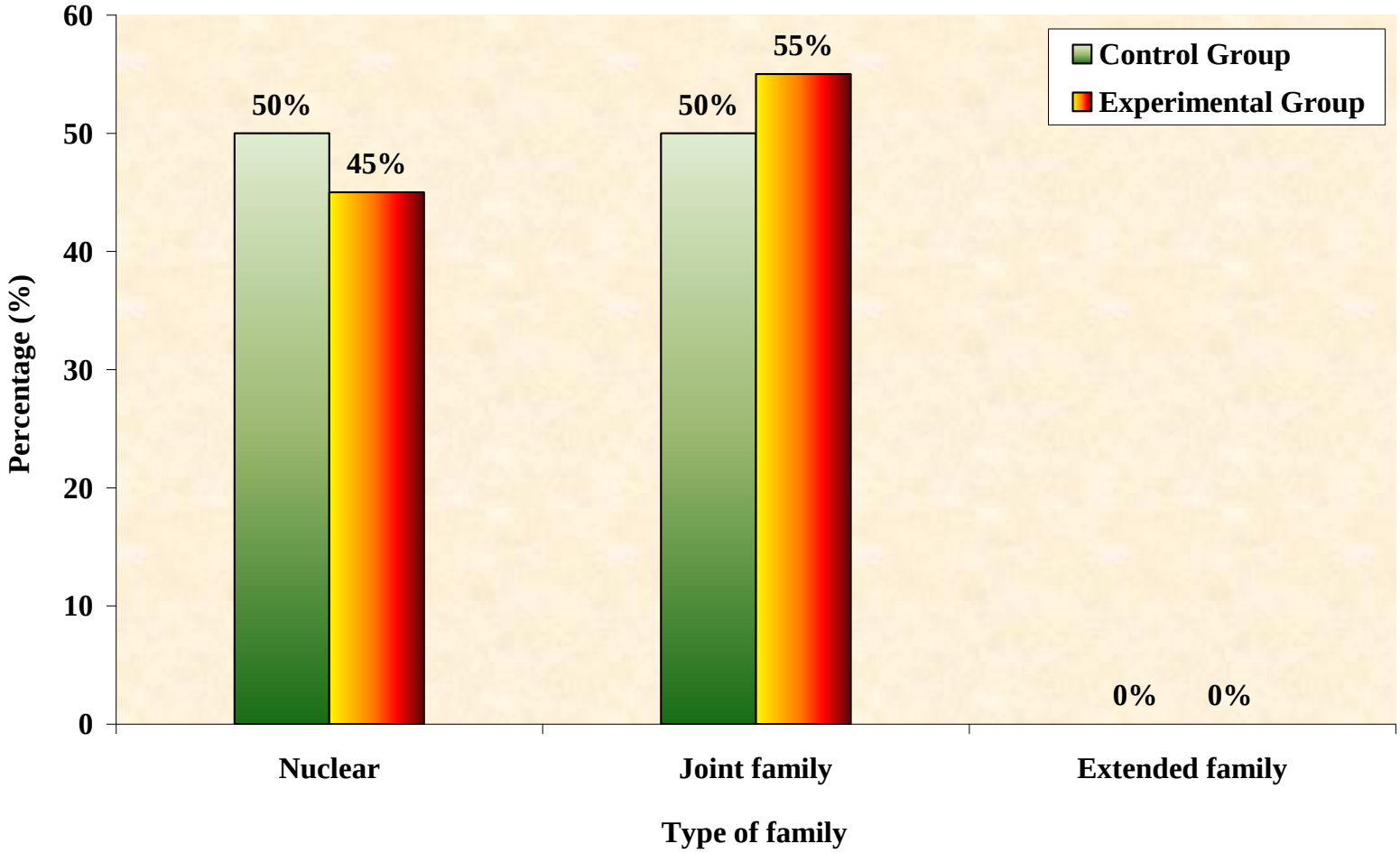

Figure. 8 Graphical Representation of Demographic Variables According to the Type of Family Among Antenatal Mothers in Control Group and Experimental Group

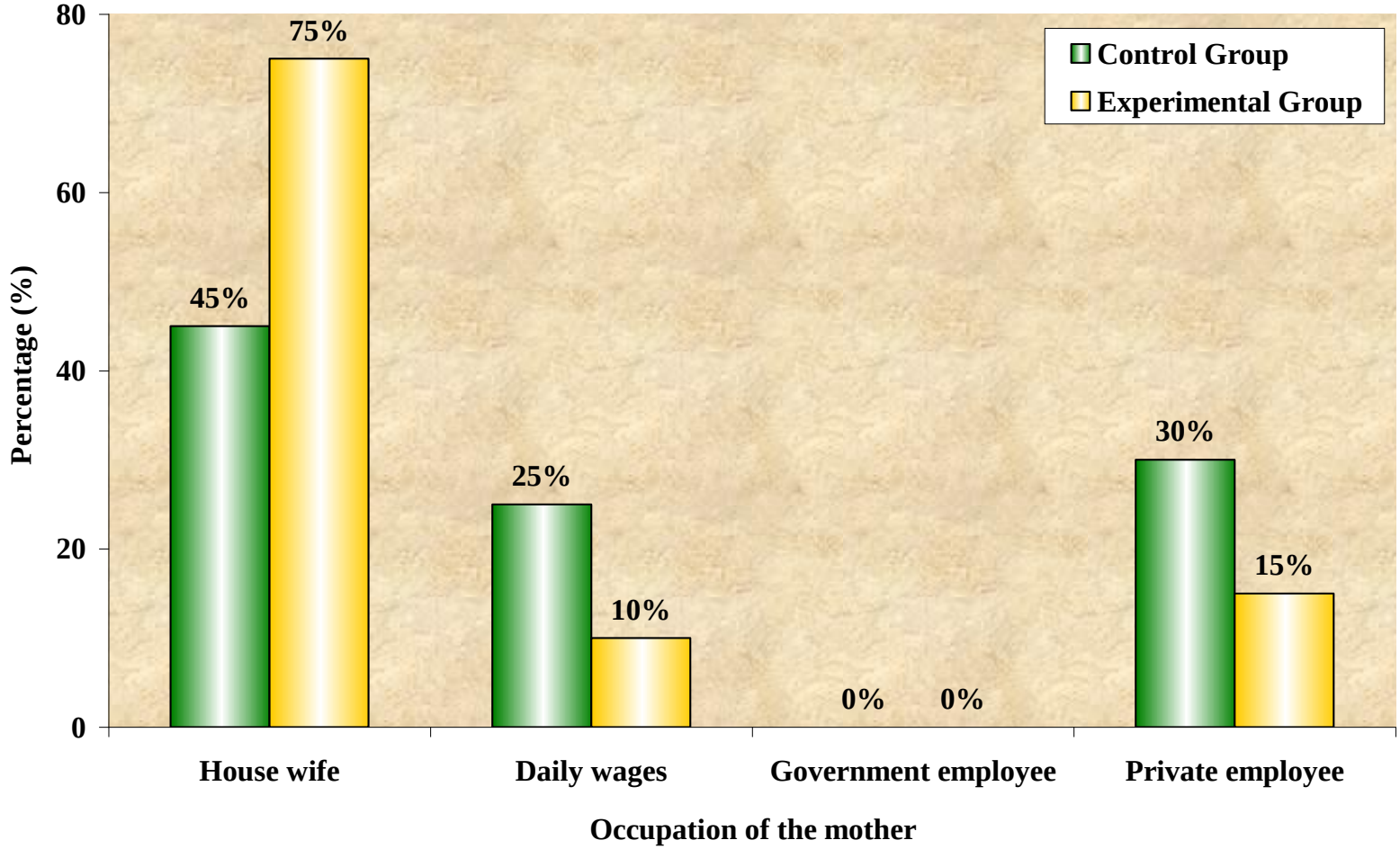

Figure. 9 Graphical Representation of Demographic Variables According to the Occupation of Antenatal Mother in Control Group and Experimental Group

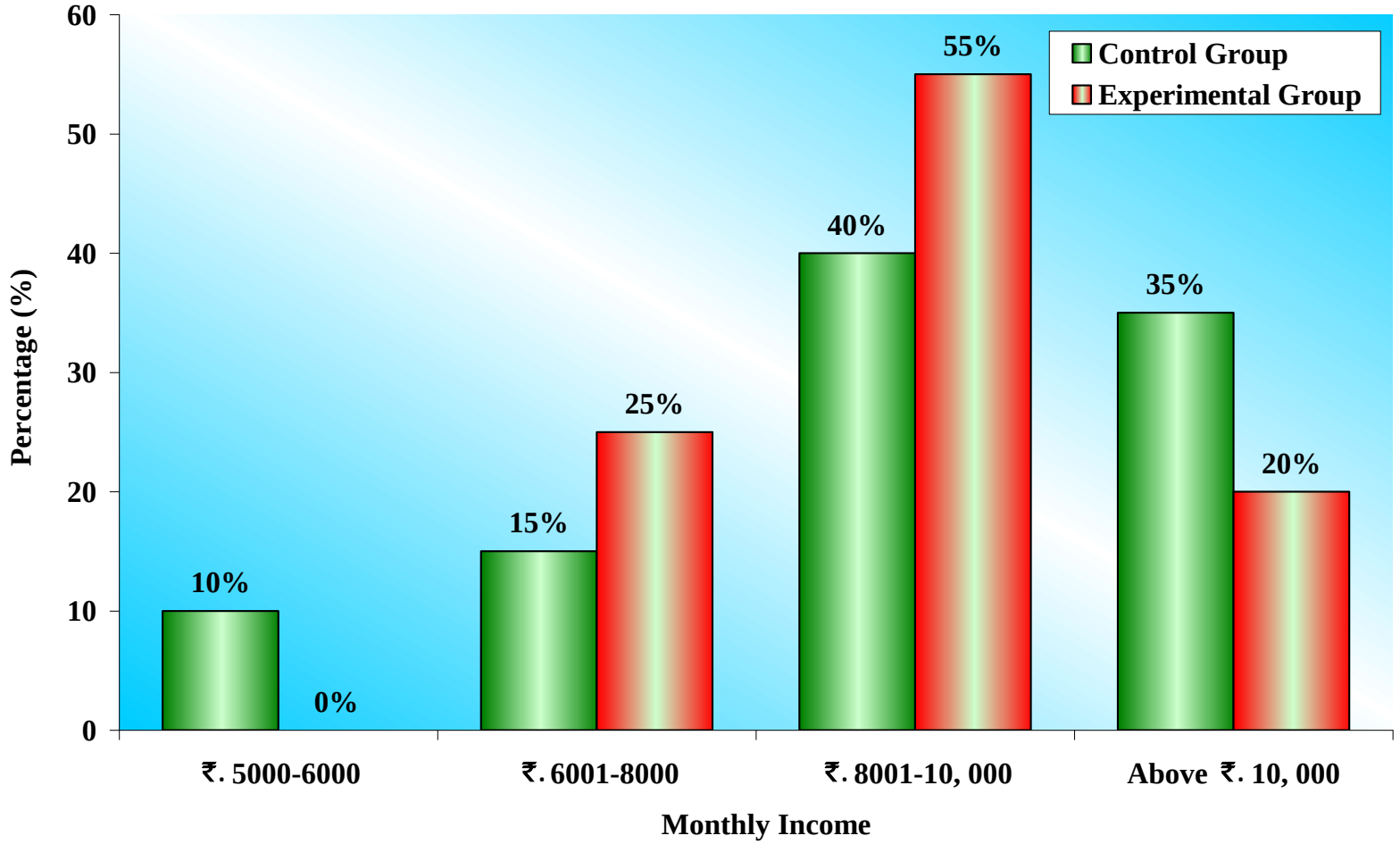

Figure. 10 Graphical Representation of Demographic Variables According to the Income of the Family in Control Group and Experimental Group

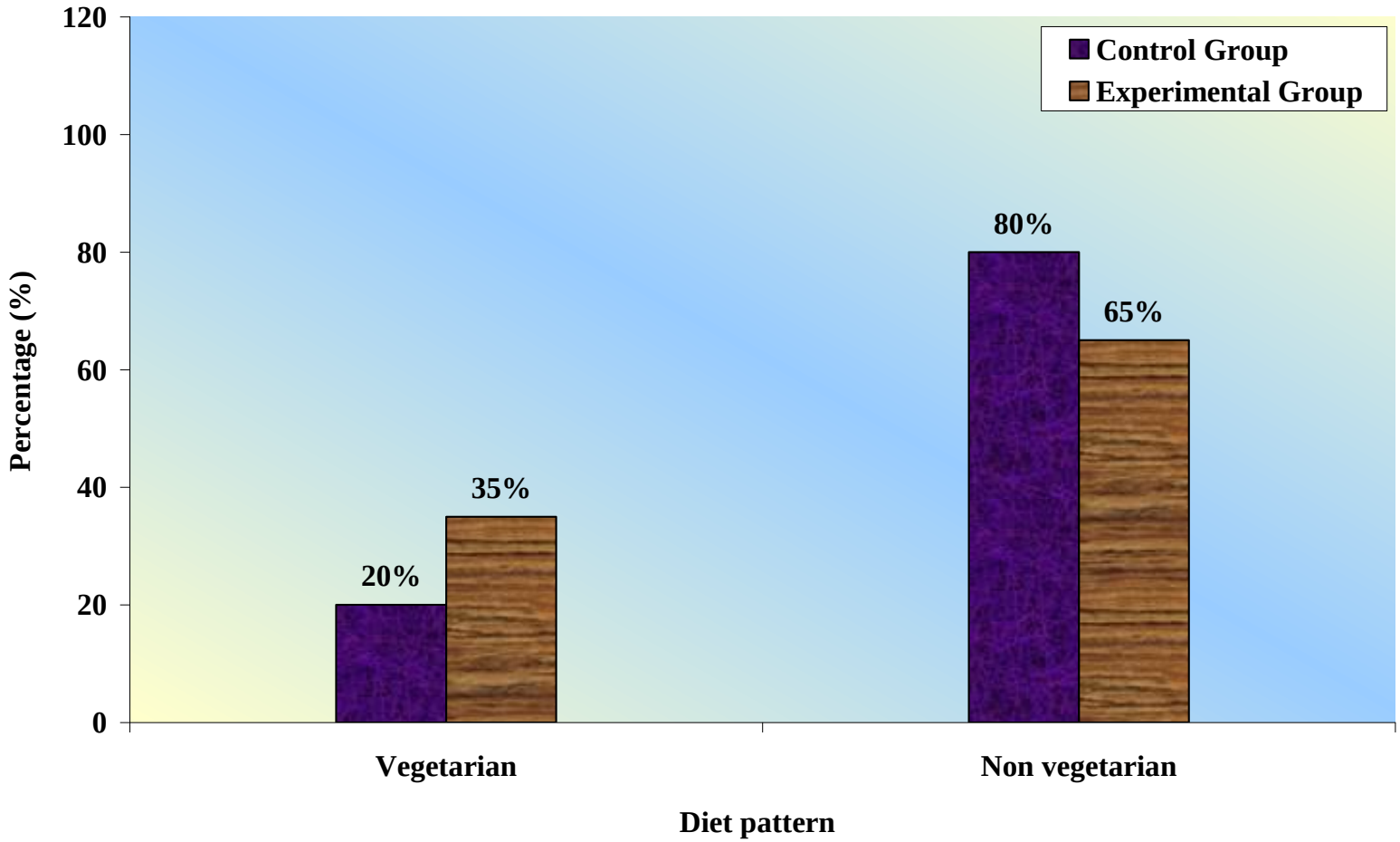

Figure. 11 Graphical Representation of Demographic Variables According to the Diet Pattern of Antenatal Mother in Control Group and Experimental Group

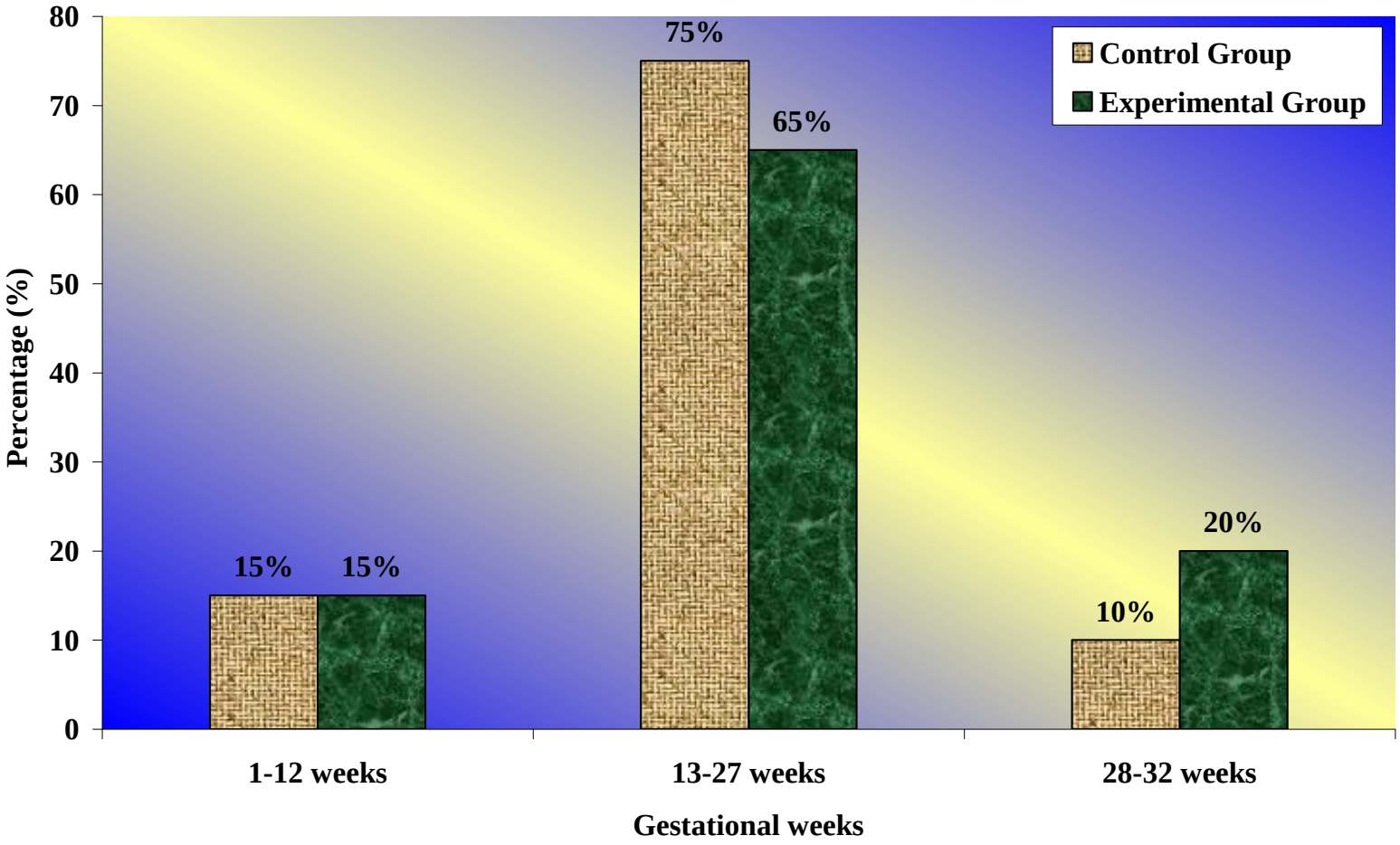

Figure. 12 Graphical Representation of Demographic Variables According to Gestational Weeks of Antenatal Mother in Control Group and Experimental Group

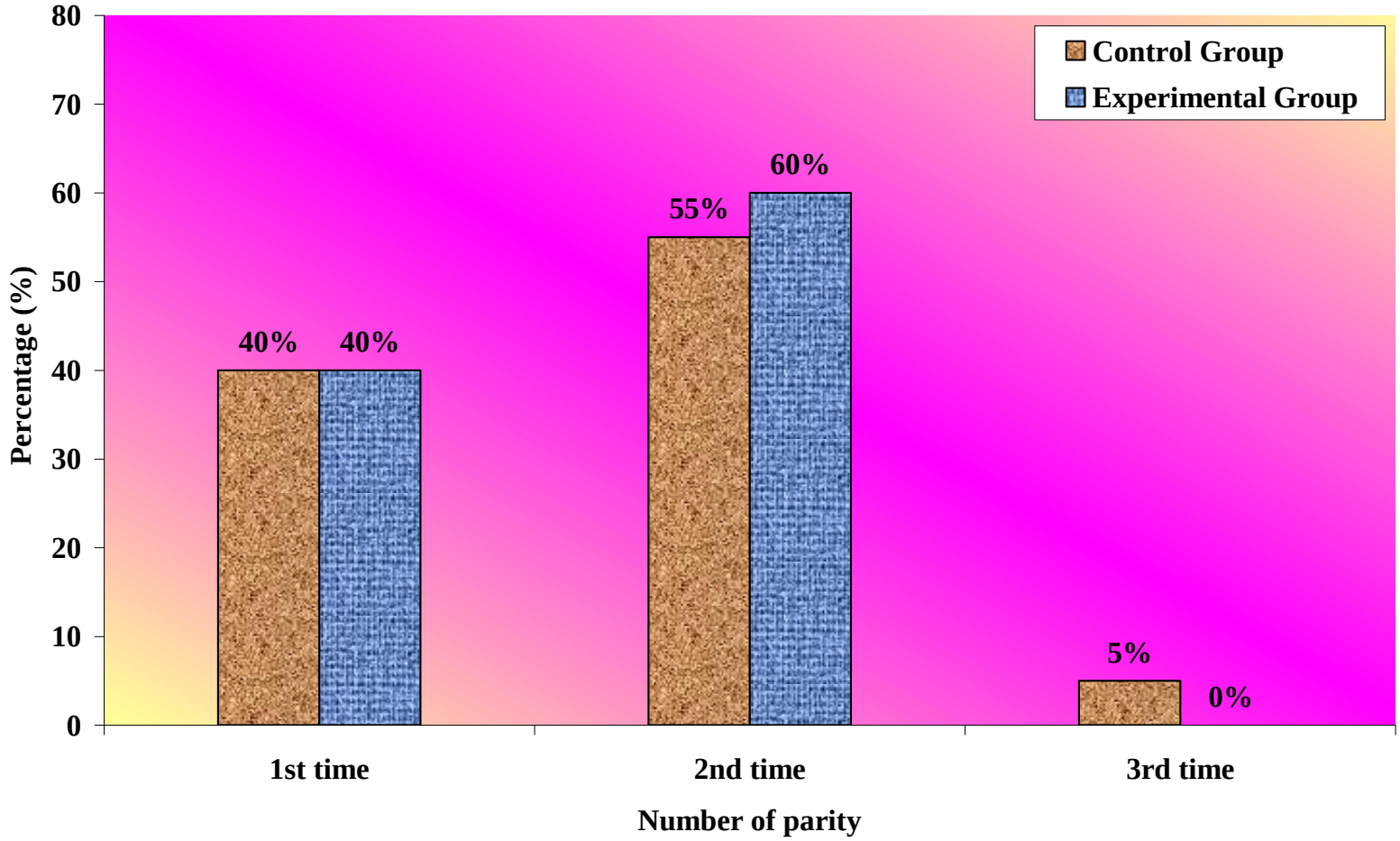

Figure. 13 Graphical Representation of Demographic Variables According to Number of Parity of Antenatal Mother in Control Group and Experimental Group

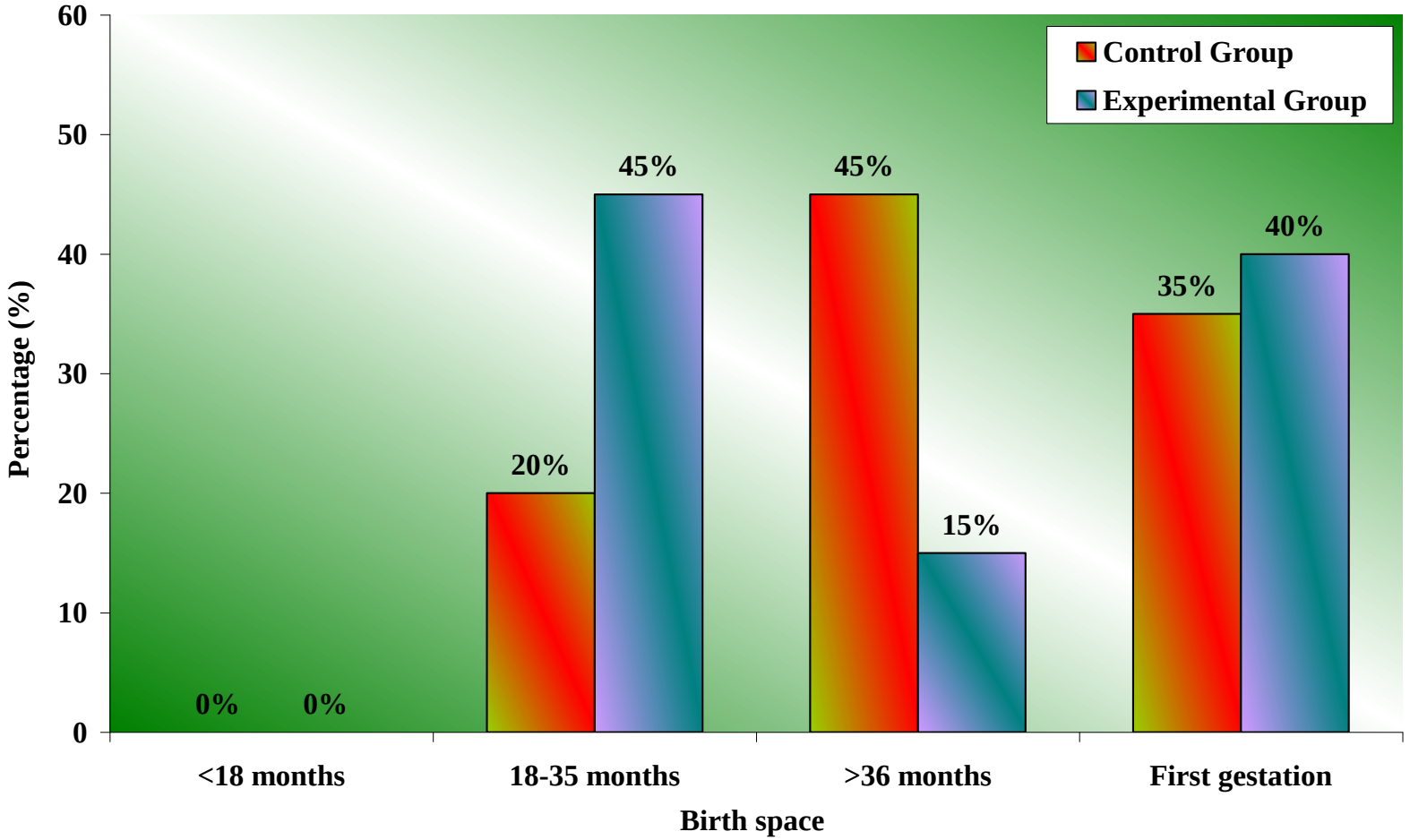

Figure. 14 Graphical Representation of Demographic Variables According to the Birth Spacing of Antenatal Mother in the Control Group and Experimental Group

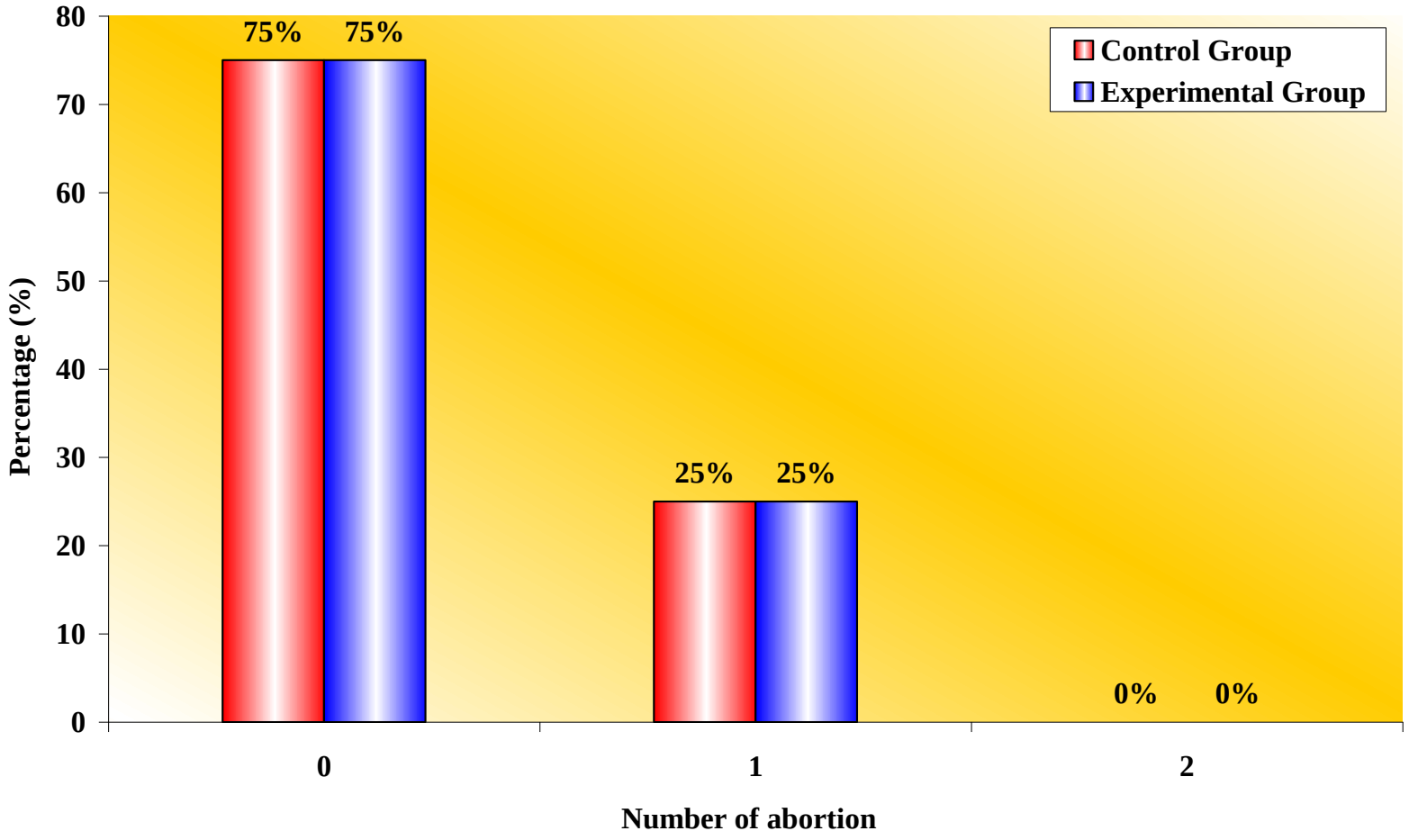

Figure. 15 Graphical Representation of Demographic Variables According to Number of Abortion of Antenatal Mother in Control Group and Experimental Group

SECTION - II

Table. 2 Distribution of Statistical Values of Pretest Scores on Level of Haemoglobin Among Antenatal Mothers of Experimental and Control Group at Aravindan Hospital, Coimbatore

(n = 40)

S.No.	Pretest Value on Level of Haemoglobin	Mean	SD	't' Value	Level of Significance
1.	Control Group	8.69	0.678	1.542 *	0.05%
2.	Experimental Group	8.32	0.795		

* Significant

Table 2 shows for 38 degrees of freedom at 0.05% level of significance, the table value was 1.686 and the calculated value was 1.542 which is less than the table value. Hence, there is no significance difference existing between level of haemoglobin in control group and experimental group before administration of beetroot extract. So homogeneity is maintained between the groups.

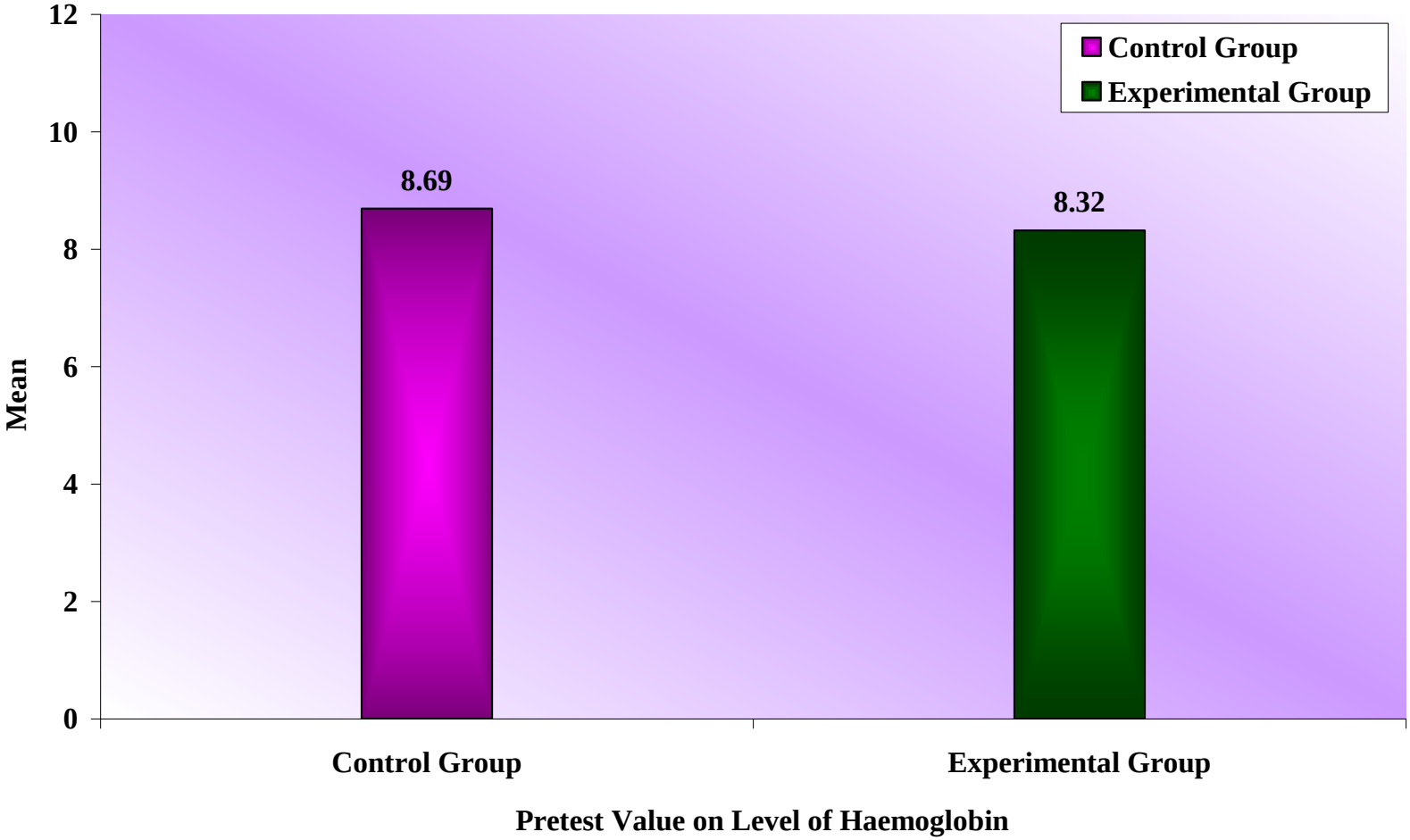

Figure. 16 Graphical Representation of Statistical Values of Pretest and Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Experimental Group

SECTION – III

Table. 3 Distribution of Statistical Values of Pretest and Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Experimental Group at Aravindan Hospital, Coimbatore

(n =20)

S.No.	Level of Haemoglobin	Pretest		Post Test	
		f	%	f	%
1.	Mild	1	5	8	30
2.	Moderate	19	95	12	60
3.	Severe	0	0	0	0

The table 3 shows the distribution of haemoglobin level in experimental group before and after administration of beetroot extract. In the pretest 1 (5%) samples were found to have mild level of haemoglobin, 19(95%) samples were found to have moderate level of haemoglobin. In posttest 8(30%) samples were found to have mild level of haemoglobin, 12(60%) sample was found to have moderate level of haemoglobin. Hence, administration of beetroot extract along with iron supplement had more significantly increased level of haemoglobin among antenatal mothers in post test score.

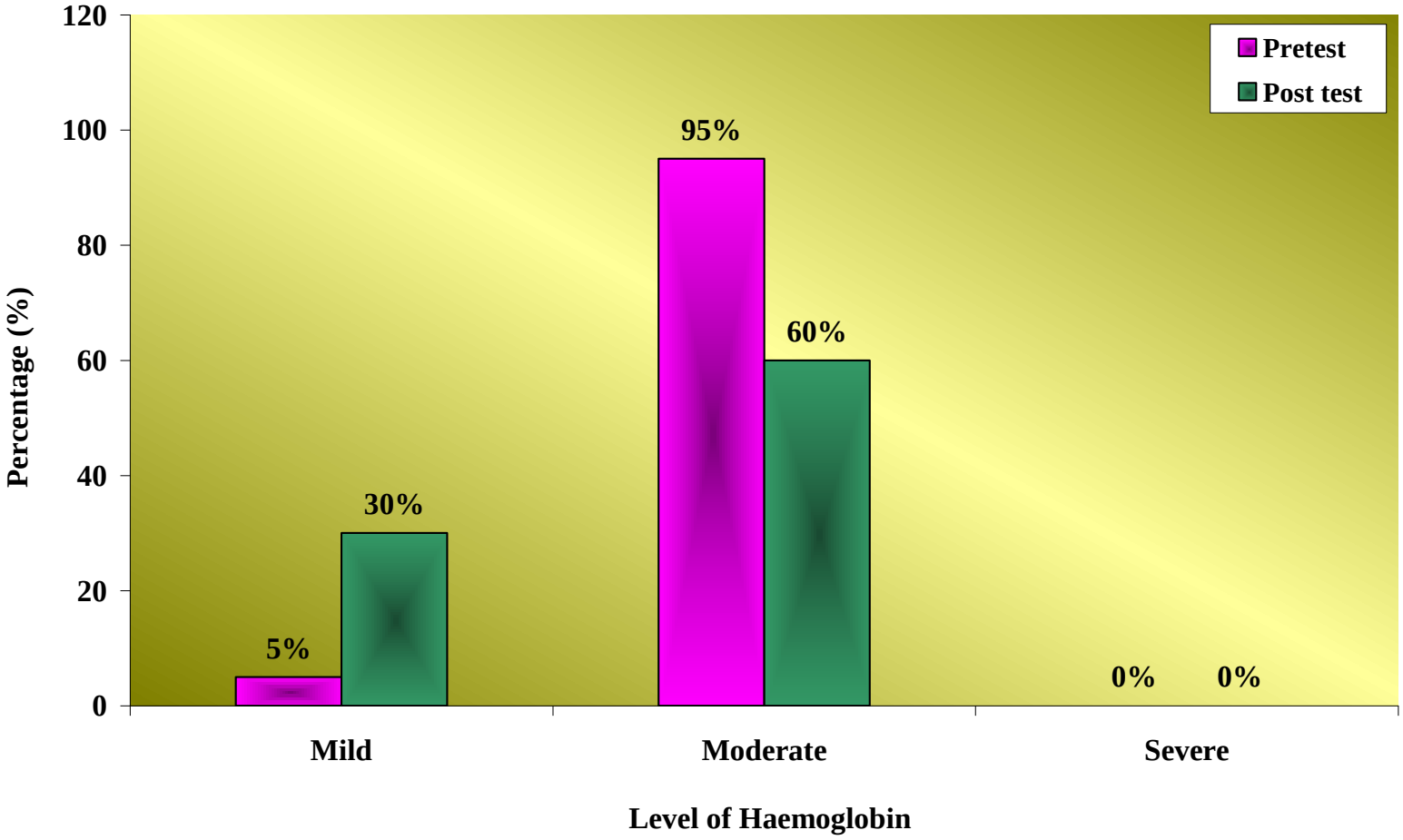

Figure. 17 Graphical Representation of Statistical Values of Pretest and Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Control Group

SECTION - IV

Table. 4 Distribution of Statistical Values of Pretest and Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Control Group at Aravindan Hospital, Coimbatore

(n = 20)

S.No.	Level of Haemoglobin	Pretest		Post Test	
		f	%	f	%
1.	Mild	1	5	4	20
2.	Moderate	19	95	16	80
3.	Severe	0	0	0	0

The table 4 shows the distribution of level of haemoglobin in control group. In the pretest 1(5%) samples were found to have mild level of haemoglobin, 19(95%) samples were found to have moderate level of haemoglobin. In posttest 4(20%) samples were found to have mild level of haemoglobin, 16(80%) sample were found to have moderate level of haemoglobin. Hence, intake of oral iron supplement alone in control group had less significantly increased in level of haemoglobin among antenatal mothers in post test score.

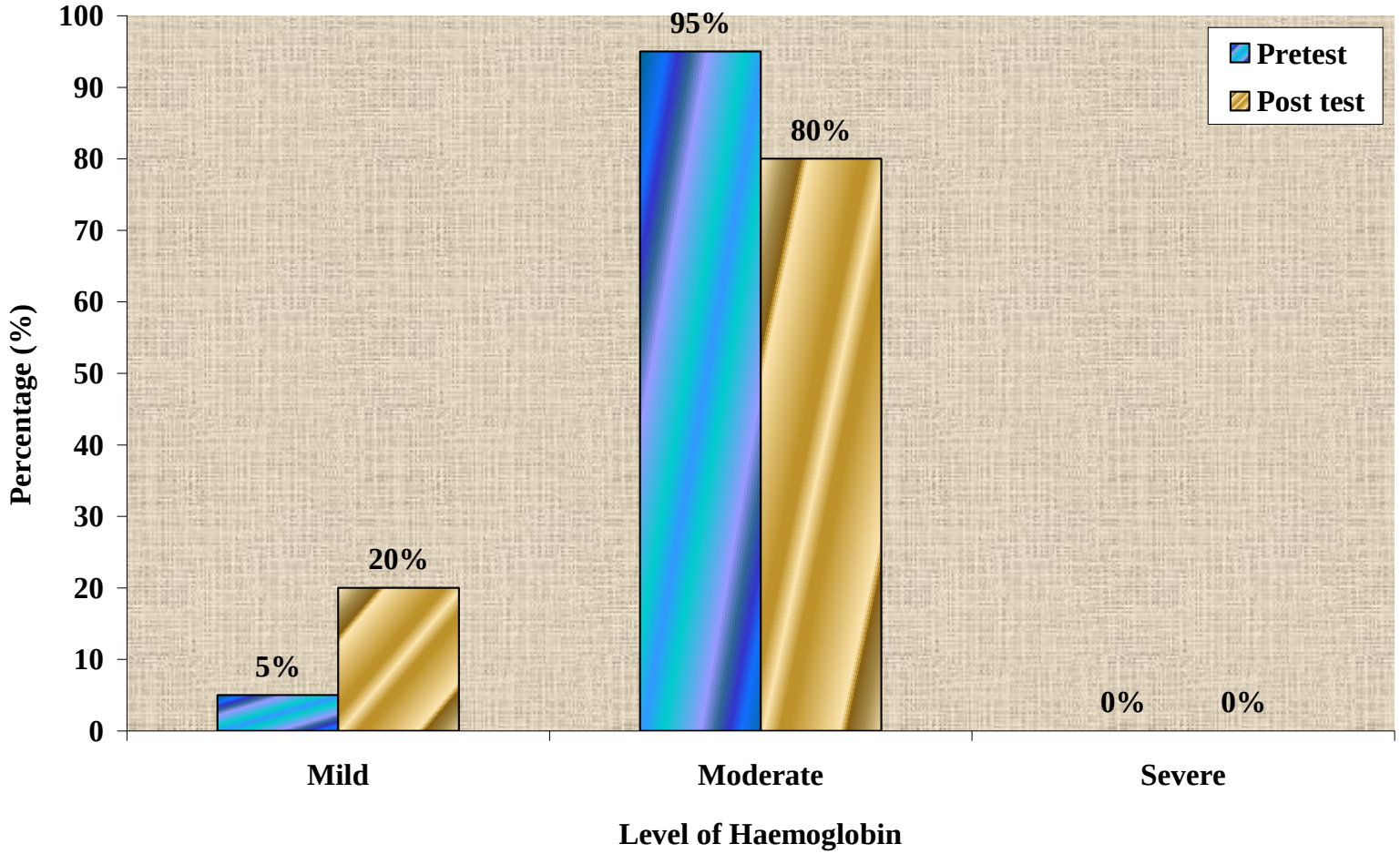

Figure. 18 Graphical Representation of Statistical Values of Pretest and Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Control Group

SECTION - V

Table. 5 Distribution of Statistical Values of Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Experimental and Control Group at Aravindan Hospital, Coimbatore

(n=40)

S.No.	Post Test Value on Level of Haemoglobin	Mean	SD	't' Value	Level of Significance
1.	Control Group	9.2	0.69	2.464*	0.05%
2.	Experimental Group	9.76	0.73		

* Significant

Table 5 shows for 38 degrees of freedom and at 0.05% level of significance, the table value was 1.686and the calculated value was 2.464, which is greater than the table value and hence there is significant differences existing between level of haemoglobin in control and experimental group after administration of beetroot juice. It is concluded that administration of beetroot juice is effective for reducing anaemia among antenatal mothers.

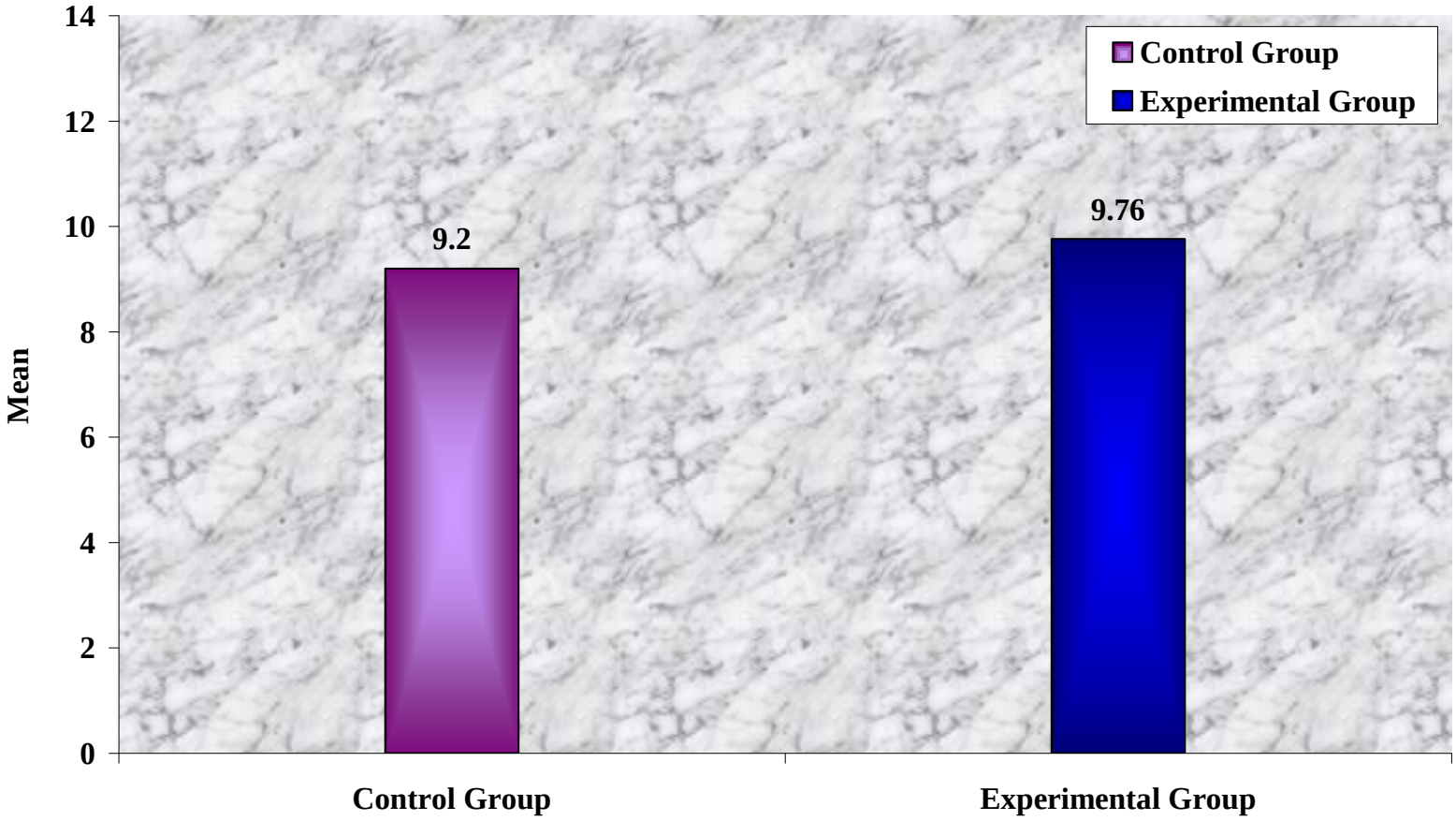

Figure. 19 Graphical Representation of Statistical Values of Post Test Scores on Level of Haemoglobin Among Antenatal Mothers of Experimental and Control Group

SECTION – VI

Table.6 Association of Haemoglobin Level with Selected Demographic Variables Among Antenatal Mothers at Aravindan Hospital, Coimbatore

(n = 20)

S.No.	Demographic Variables	Above Mean	Below Mean	df	χ^2
1.	**Ag in years**				
	a) 20-24 years	4	4		
	b) 25-29 years	6	6	3	0
	c) 30-34 years	0	0		
	d) Above 35 years	0	0		
2.	**Education status of the mother**				
	a) Illiterate	1	2		
	b) Secondary school	3	2	3	0.94
	c) Higher secondary school	5	4		
	d) Degree	1	2		
3.	**Type of family**				
	a) Nuclear	5	4		
	b) Joint family	5	6	2	0.2
	c) Extended family	0	0		
4.	**Occupation**				
	a) Housewife	6	9		
	b) Daily wages	1	1	3	0.71
	c) Government employee	0	0		
	d) Private employee	2	1		
5.	**Monthly income of the family**				
	a) ₹.4000-5000	0	0		
	b) ₹.6001-8000	2	3	3	0.28
	c) ₹.8001-10, 000	6	5		
	d) Above 10, 000	2	2		

(Table 6 continues)

(Table 6 continued)

S.No.	Demographic Variables	Above Mean	Below Mean	df	χ^2
6.	**Diet pattern**				
	a) Vegetarian	3	4	1	0.639
	b) Non-vegetarian	8	5		
8.	**Number of parity**				
	a) 1st time	4	4		
	b) 2nd time	6	6	2	0
	c) 3rd time	0	0		
9.	**Birth spacing**				
	a) <18 months	0	0		
	b) 18-35 months	5	4	3	3.664
	c) > 36 months	2	1		
	d) First gestation	4	4		
10.	**Number of abortion**				
	a) 0	8	7		
	b) 1	2	3	2	0.266
	c) 2	0	0		

Table 6 shows the association of pre test attitude score with demographic variables Age, Educational Status, type of family, occupation, monthly income of the family, diet pattern, gestational age, number of parity, birth space and number of abortion among antenatal mothers. Variables were not having significant association with the pretest score.

CHAPTER - V

Results and Discussion

This is an experimental study a study to assess the effectiveness of beetroot extract in reducing anemia among antenatal mothers at Aravindan hospital, Kovilpalayam in Coimbatore. The level of haemoglobin was assessed by Sahli's haemoglobinometer. The data were analyzed by using descriptive and inferential statistics. The results of the study were discussed according to the objective.

The First Objective of the Study was to Monitor the Haemoglobin Level Among Antenatal Mothers in Experimental and Control Group

The level of haemoglobin was assessed by Sahli's haemoglobinometer. The sample size was 40. The mean pre test haemoglobin level among control and experimental group 8.69 and 8.32 the findings imply that there was homogeneity exist among control group and experimental group before administering beetroot extract.

Layla Solimen (2009) conducted a study in Russia on prevalence of anaemia among pregnant mothers by measuring haemoglobin level using sahlis haemoglobinmeter. The study result showed that 66.4% of antenatal mothers were anaemic.

The Second Objective of the Study was to Administer the Beetroot Extract Among Antenatal Mothers for Experimental Group Along with Iron Supplement

The samples were selected by non-probability convenient sampling technique on the basis of selection criteria. On the first day of study, the heamoglobin levels

were assessed, and 100 ml of beetroot extract administered to the experimental group for thirty days. Post test haemoglobin levels were assessed in 30th day of study.

Sharm. J. B, et.al., (2010) conducted a study in Delhi to determine the effect of different dietary habits on prevalence of anaemia during pregnancy the sample consist of 1150 women assessing their dietary habit and haemoglobin level by using questioning method. The study shows that most women were anaemia in the second (26%) and third trimester (63.2%) of pregnancy. Prevalence of anaemia was found to be very high of 1150 women, 96% were anaemic (89.8% mildly anaemic, 5.3% severely anaemic).

The Third Objective of the Study was to Remonitor the Haemoglobin Level Among Antenatal Mothers of Experimental and Control Group

The findings after analysis revealed that the pre test mean values of haemoglobin level among antenatal mother in control group and experimental group were 8.69 and 8.32. The mean post test values of haemoglobin level in control group and experimental group were 9.2 and 9.76. This revealed that there was a significant difference exists between the pre test and post test mean value among experimental group and control group. It showed that administration of beetroot extract was effective in reducing anaemia among antenatal mothers in experimental group.

Soniya Rashed (2009) conducted a study toassess the effectiveness of practice of iron supplement on haemoglobin among antenatal mothers, 34 antenatal mothers are screened for haemoglobin level using Sahils haemoglobinometer. The result of the study showed pretest haemoglobin level was 8.09 and mean haemoglobin level increased to 8.53 in posttest.

The Fourth Objective of the Study was to Compare the Level of Haemoglobin Before and After Administration of Beetroot Extract Among Antenatal Mothers in the Experimental Group

The findings after analysis revealed that the pre test mean values of haemoglobin level among antenatal mother in experimental group were 8.32. The mean post test values of haemoglobin level in experimental group were 9.76. This revealed that there was a significant difference exists between the pre test and post test mean value among antenatal mother in experimental group. This implies that administration of beetroot extract was effective on reducing anaemia among antenatal mothers in experimental group.

Jagadeesh (2010) conducted a pre-experimental study to assess the effectiveness of beetroot extract on anemia among adolescent girls at selected school Mysore. 60 samples were selected between the age group of 14 and 16 years by convenience sampling technique. Levels of anemia were assessed by clinical, physiological signs and symptoms before and after administration of intervention. Beetroot juice was administered (100ml) for 20 days. After that post test was assessed there was a significant improvement in the hemoglobin level (82%) $p<0.01$.

The Fifth Objective of the Study to Findout the Association Between the Level of Haemoglobin with Selected Demographic Variable Among Antenatal Mothers

The demographic variables Age, Educational Status, type of family, occupation, monthly income of the family, diet pattern, and gestational age, number of gestation, birth space and number of abortion among antenatal mothers were associated with pretest haemoglobin level in experimental group. It was noticed that there was no association between pretest value with demographic variables.

CHAPTER - VI

Summary, Conclusion, Nursing Implications, Limitations and Recommendations

Summary

The aim of the study was to assess the effectiveness of beetroot extract on reducing anaemia among antenatal mothers. according to WHO anaemiain pregnancy is present when the haemoglobin concentration in the peripheral blood is 11gm or less. This study motivated antenatal mothers to gain knowledge regarding beetroot extract improving haemoglobin level during antenatal period and thus help to prevent related complication. the result of the study were discussed according to the objectives.

The Following Objectives were Set for the Study

- To monitor the haemoglobin level among the antenatal mothers in the experimental and control group.
- To administer the beetroot extract for experimental group among antenatal mothers along with iron supplement
- To remonitor the haemoglobin level among antenatal mothers of experimental and control group.
- To compare the level of haemoglobin before and after administration of beetroot extract among antenatal mothers in the experimental group.
- To findout the association between the level of haemoglobin with demographic variable among antenatal mothers.

The Alternative Hypothesis Set for the Study

The administration of beetroot extract helps to reduce the anaemia among antenatal mothers.

Major Findings of the Study were as Follows

- The pre test mean score of control group and experimental group on the level of haemoglobin before administration of beetroot extract was 8.69 and 8.32.
- The obtained 't' value among control and experimental group before administration of beetroot extract was 1.542.
- The post test mean score control group and experimental group on the level of haemoglobin after administration of beetroot extract was 9.2 and 9.76
- The obtained 't' value after administration of beetroot extract on reduction of anaemia among control group and experimental group was 2.464.
- The pretest and post test result for experimental group revealed that 1 (5%) had mild anaemia, 19(95%) had moderate anemia, 0(0%) had severe anaemia in pretest.
- Where as in posttest 8(30%) had mild anaemia, 12(60%) had moderate anaemia and 0(0%) had severe anaemia.
- The pretest and post test result for control group revealed that 1 (5%) had mild anaemia, 19(95%) had moderate anemia, 0(0%) had severe anaemia in pretest.
- Where as in posttest 4(20%) had mild anaemia, 16(80%) had moderate anaemia and 0(0%) had severe anaemia.
- There was no association between pre test score on level of haemoglobin with demographic variables among experimental and control group.

Conclusion

The level of haemoglobin among antenatal mothers who received beetroot extract was significantly reduced than those who did not received beetroot extract.

The post test value of haemoglobin level among antenatal mothers who received beetroot extract was significantly lesser than the who did not receive beetroot extract. So the beetroot extract has significant effect on reducing the anaemia among antenatal mothers. Hence the formulated alternative hypothesis was accepted.

Nursing Implications

The finding of the study has implications in various of nursing education and administration and nursing research.

Nursing Education

- Nursing curriculum is a means through which future nurses are prepared. The emphasis needs to be planned on preventive and promotive health practice.
- The nursing curriculum should be updated with the inclusion of topics on complementary and alternative therapies.
- The results of the study emphasize learners to utilize the knowledge of administration of beetroot extract in reducing anaemia among antenatal mothers. This procedure can be incorporated in the nursing curriculum. Periodic conference, seminar, symposium etc can be arranged on effect of beetroot extract in reducing anaemia among antenatal mothers.

Nursing Practice

- If midwife has knowledge regarding Administration of beetroot extract reduce anaemia. She can teach to the mother. So that they can able to get knowledge on non pharmacological treatment without side effect
- Community people also impart knowledge regarding administration of beetroot extract in order to reduce the anaemia among antenatal mothers.

Nursing Administration

- Nurse administrators should take interest in formulating guidelines and various modalities of treatment of anaemia .Through in service education programme, nurse can be motivated to learn and practice the complementary therapy for anaemia.
- The nursing administrators should be able to motivate and initiate the health personnel in organizing and participating various educational programmes and improve their skills and knowledge.

Nursing Research

- The nursing research should be aware of new trends in exisiting health care system
- The findings of the present study can be a foundation to conduct study on large population to strongly prove the efficiency of beetroot extract on anaemia among antenatal mothers.
- It can be used for evidence based practice as a new trend in treatment modalities of anaemia.
- It can be used as a motivation for the nurses to conduct the research in future in comparing different and other techniques to reduce anaemia.

Limitations

- The size of the sample was small to draw conclusion.
- The researcher could not use randomized sampling technique in this study.
- Assessment at a fixed time schedule was not possible because of hospital policies.

Recommendations

- A similar study can be conducted for a large group of samples as a long term basis.
- A similar study can be conducted with randomization of samples.
- A similar study can be conducted to assess the effectiveness of beetroot juice reducing blood pressure and improve blood flow.

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ABSTRACT

Statement of the Problem : A study to assess the effectiveness of beetroot extract on reducing anemia among antenatal mothers at aravindan hospital in Coimbatore. **Study Objectives : (a)** To monitor the haemoglobin level among the antenatal mothers in the experimental and control group. **(b)** To administer the beetroot extract for experimental group among antenatal mothers along with iron supplement. **(c)** To remonitor the haemoglobin level among antenatal mothers of experimental and control group. **(d)** To compare the level of haemoglobin before and after administration of beetroot extract among antenatal mothers in the experimental group. **(e)** To findout the association between the level of haemoglobin with demographic variable among antenatal mothers. **Methodology :** Quantitative approach, quasi-experimental pretest post test control group design was used for the present study. The sample for the study consists of 40 antenatal mothers, 20 in experimental group and 20 in control group, selected by non probability convenient sampling technique. Sahil's haemoglobinometer was used to assess the haemoglobin level. **Results :** Inferential and descriptive statistics were used to analyze the data. The obtained 't' value for level of haemoglobin after administration beetroot extract of was 2.464. The obtained 't' value for haemoglobin level were higher than the table value. **Conclusion :** The level of haemoglobin of antenatal mothers who received beetroot extract was more significantly reduced anaemia than those who did not received beetroot extract.

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To

Through

The Principal,
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Coimbatore – 35.

Respected Sir,

Sub : Seeking permission for conducting research study

I am a student of M.Sc Nursing in PPG College of Nursing. Our college is affiliated to the Tamilnadu Dr. M. G. R Medical University, Chennai. I have taken the specialization in Obstetrics and Gynecology Nursing.

Topic : A STUDY TO ASSESS THE EFFECTIVENESS OF BEETROOT EXTRACT ON REDUCING ANAEMIA AMONG ANTENATAL MOTHERS AT ARAVINDAN HOSPITAL, COIMBATORE

I request you to kindly permit me to conduct my study in your institutions. Hope you will consider my requisition and do the needful.

Thanking you,

Yours sincerely,

Date :

Place : Coimbatore

Requisition Letter for Content Validity

From

M.Sc (N) II Year,
PPG College of Nursing,
Coimbatore – 35.

To

Through : Principal, PPG College of Nursing

Respected Sir/Madam,

Sub : Requisition for expert opinion and suggestion for content validity of tool

I am a student of M.Sc (N) II year, PPG College of Nursing affiliated to the Tamilnadu Dr. M. G. R. Medical University, Chennai. As a partial fulfillment of the M.Sc (N) programme. I am conducting

A STUDY TO ASSESS THE EFFECTIVENESS OF BEETROOT EXTRACT ON REDUCING ANAEMIA AMONG ANTENATAL MOTHERS AT ARAVINDAN HOSPITAL, COIMBATORE

Herewith I have enclosed the developed tool for content validity and for the expert opinion and possible solution. It would be very kind of you to return the same as early as possible.

Thanking you,

Yours faithfully,

PPG College of Nursing

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Total content for the tool :

Kindly validate each tool and tick wherever applicable

S.No	No. of Tool/Section	Strongly Agree	Agree	O.K	Not Applicable	Need Modification	Remarks

Remarks

Signature of the Expert with Date

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SECTION – A

Demographic Variable

Instructions

The investigator place a tick mark (✓) in corresponding box according to the responses of the subjects.

Sample No. _____

1. Age in year
    a) 20-24 years ☐
    b) 25-29 years ☐
    c) 30-34 years ☐
    d) Above 35 years ☐

2. Educational status of the mother
    a) Illiterate ☐
    b) Secondary ☐
    c) Higher secondary ☐
    d) degree ☐

3. Type of family
    a) Nuclear ☐
    b) Joint family ☐
    c) Extended family ☐

4. Occupation of mother

    a) Unemployment ☐

    b) Daily wages ☐

    c) Government employee ☐

    d) Private employee ☐

5. Monthly income of the family

    a) ₹. 5000-6000 ☐

    b) ₹. 6001-8000 ☐

    c) ₹. 8001-10,000 ☐

    d) ₹. 10,000 above ☐

6. Diet pattern

    a) Vegetarian ☐

    b) Non vegetarian ☐

Obstetrical Variables

7. Gestational weeks of the mothers

    a) 1-12 weeks ☐

    b) 13-27 weeks ☐

    c) 28-32 weeks ☐

8. Number of parity

    a) 1st time ☐

    b) 2nd time ☐

    c) 3rd time ☐

9. Birth spacing

a) <18 months ☐

b) 18-35 months ☐

c) > 36 months ☐

d) First gestation ☐

10. Number of abortion

a) 0 ☐

b) 1 ☐

c) 2 ☐

பிரிவு (அ)

மக்கள் தொகை மாறிகளின் முறையான நேர்காணல் படிவம்

மாதிரி எண் _____

1. ஆண்டு வயது

அ) 20-24 வயது ☐

ஆ) 25-29வயது ☐

இ) 30-34 வயது ☐

ஈ) 35 வயது மேல் ☐

2. கல்வி தகுதி

அ) படிப்பறிவில்லாதவள் ☐

ஆ) உயர்நிலைகல்வி ☐

இ) மேல்நிலைக்கல்வி ☐

ஈ) பட்டதாரி ☐

3. குடும்ப வகை

அ) தனிக்குடும்பம் ☐

ஆ) கூட்டு குடும்பம் ☐

இ) விரிவுபட்ட குடும்பம் ☐

4. தொழில்

அ) வேலையின்மை ☐

ஆ) நாள் கூலி ☐

இ) அரசு பணியாளர் ☐

ஈ) தனியார் பணியாளர் ☐

5. குடும்பத்தின் மாத வருமானம்

அ) ₹. 5000-6000 ☐

ஆ) ₹. 6001-8000 ☐

இ) ₹. 8001-10,000 ☐

ஈ) ₹. 10,000 மேல் ☐

6. உணவு முறை

அ) சைவம் ☐

ஆ) அசைவம் ☐

மகப்பேறியல் மாறிகள்

7. தாயின் கருத்தங்கல் (வாரங்கள்)

அ) 1-12 வாரம் ☐

ஆ) 13-27வாரம் ☐

இ) 28-32 வாரம் ☐

8.தாயின்

அ) முதல் முறை ☐

ஆ) இரண்டாவது முறை ☐

இ) மூன்றாவது முறை ☐

9 பிறப்பு இடைவெளி மாதம்

அ) <18 மாதம் ☐

ஆ) 18-35 மாதம் ☐

இ) >36 மாதம் ☐

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PROTOCOL

Introduction

Anaemia in pregnancy is an important public health problem worldwide woman often become anaemic during pregnancy because the demand for iron and other vitamins is increased due to physiological burden of pregnancy, the inability to meet the required level for these substances either as a result of dietary deficiencies or infection gives rise to anaemia.

Beetroot juice is classed as a super food because it contains potassium, magnesium and iron as well as vitamins and folic acid. When the Betain pigment is absorbed into the blood it can reportedly increase the oxygen-carrying ability of the blood by up to 400 per cent.

Meaning of Terms

Anaemia in Pregnancy

Anaemia is the most common disorder of pregnancy .It defined as a reduction, below normal in the number of red blood corpuscles per cubic millimeter .the quantity of haemoglobin and the volume of packed red cells per 100ml of blood. WHO, as a haemoglobin concentration of < 11 mg /dl.

Beetroot

It is also known simply as beet or by its scientific name beta vularis. It contains Betanin. So, it is high in iron, Vitamins A and C, and high in calcium. It also contains folic acid, protein, manganese, potassium and fibre. The iron content in beetroot can help those suffering from anaemia and fatigue,

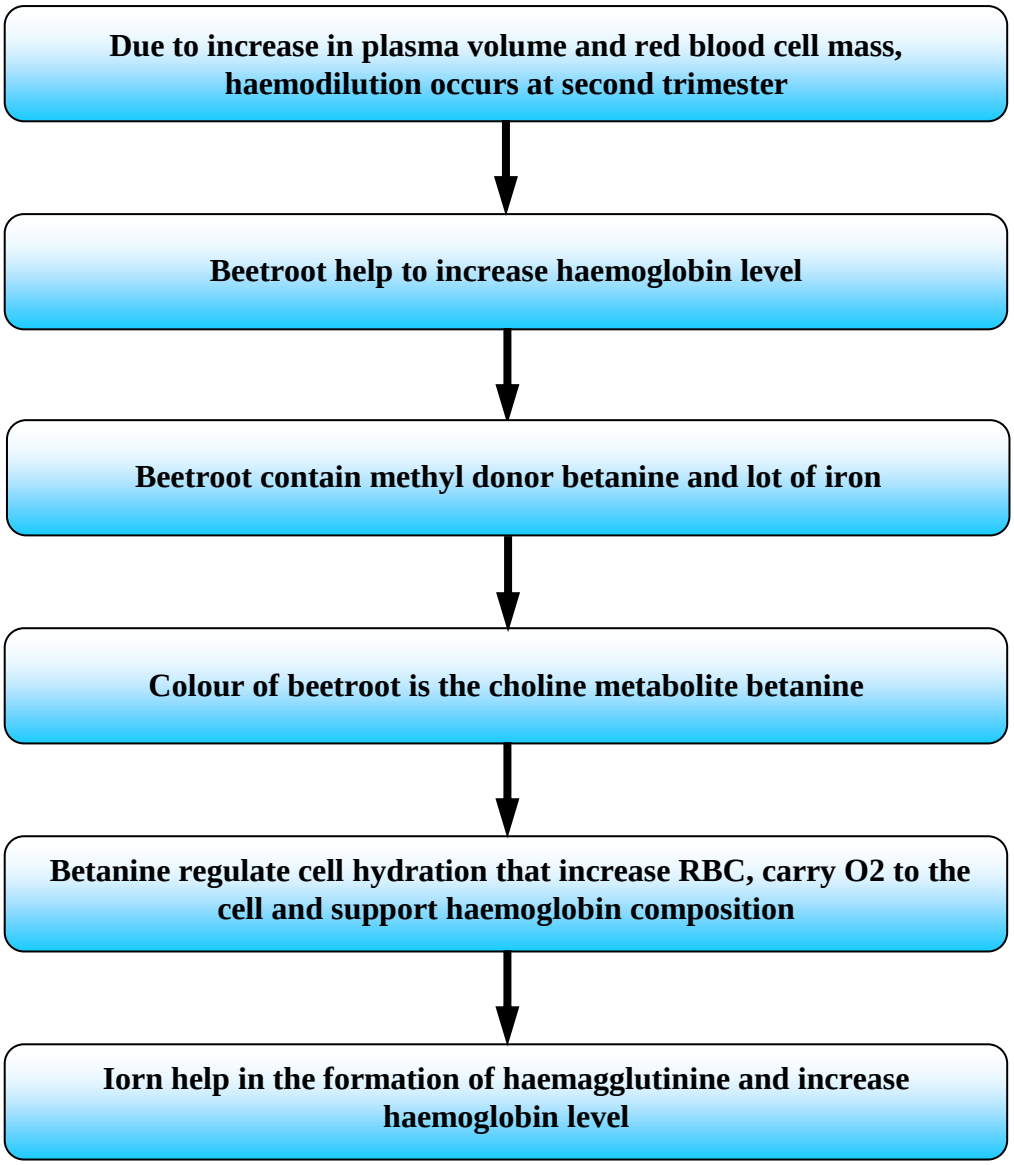
Etiology

- RBC destruction
- Decrease erythrocyte production
- Depleted iron stores
- Chronic infection
- Repeated pregnancies
- Unknown

Effects of Anaemia On Pregnancy

- Increase the incidence of abortion
- Premature labour
- Intra uterine death of the foetus
- Intra uterine hypoxia
- Resistance to infection is lowered
- Small for gestational age
- High output cardiac failure for mother
- Low birth weight
- Preterm birth

Mechanism of Beetroot Extract on Reducing Anaemia in Pregnancy



Clinical Manifestation

- Pallor - skin, lips , conjunctiva and nails
- Fatigue
- Giddiness
- Breathlessness
- Feeling tired or weak
- Increased susceptibility to illness and infection

Investigation

Haemoglobin

- Haematocrit
- RBC indices;
- Low MCV
- Low MCH

Peripheral Blood Study

- Microcytic hypo chromic anaemia
- Serum transfer in receptor
- Present on all cells as trans membrane protein that binds transferring iron and transfer it to cell interior
- Bone marrow examination
- Urine for haemturia
- Stool examination for ova, cyst and occult blood

Benefits of Beetroot

Beetroot juice can provide protection against birth defects. Another one of the benefits of beet juice is the fact that it is a very good source of folic acid (also called folate). To prevent the possibility of birth defects, doctors recommend the B vitamin folate in a pregnant woman's diet.

Folic Acid is a key vitamin for proper foetus development as it helps in the proper development of the infant's spinal column and optimal brain development. Folate is very involved in the production of new cells and the maintenance of existing cells.

- **Anaemia** - Beets are rich in iron, which is easily assimilated by the body. They build up the haemoglobin and cleanse the blood.
- **Antioxidant** - The deep, red pigment betacyanin is a powerful antioxidant and protects against several types of cancer
- **Cholesterol** - One of the health benefits of beets is that eating them can help lower your LDL cholesterol.
- **Colon Health** - Beets are full of fiber, which helps to move wastes through the intestines and helps to prevent constipation. Also, the antioxidants found in beets protect against colon cancer.
- **Constipation** - The high fiber content of beets makes them excellent to relieve constipation.
- **Eye Health** - Traditionally, beetroot juice has been use to improved eye health and fatigue.
- **Heart Disease** - The abundance of vitamins and minerals in beetroot helps to protect against heart disease.
- **Inflammation Reduction** - The compound called betaine found in red beets can reduce. Inflammation in joints, bones and blood vessels. This reconstruction in inflammation helps those suffering from asthma and osteoporosis.
- **Liver** - Beet juices helpful in detoxifying the liver.
- **Menstrual Problems** - Beetroot juice has been shows to help correct menstrual problems in women.
- **Pregnant Women** - Beets are high in folic acid which helps to prevent birth defects in your unborn baby. Folic acid is important whenever your body is

actively making new cells when healing after physical trauma or when children are growing.

- **Stamina Increase** - Drinking beetroot juice boosts stamina and can increase your workout time by causing a reduction in the uptake of your oxygen, thus increasing you stamina. The natural and unprocessed abundance of carbohydrates found in beets are an excellent source of energy for your body.

Beetroot Juice Side Effect

Generally, beetroot consumption is safe

- Excess consumption causes the colouring from the beetroot to find its way into urine, making it a pink colour known as beeturia.
- Discoloration of your stool.
- Excessive uses can cause nausea,diarrhea
- Heart burn
- People with chronic liver or kidney problems should be especially careful when drinking beet juice and only do so in very small doses.

Procedure – How to Make a Beetroot Juice

Ingredients

- Beetroot extract – 50 ml
- Water -50 ml
- Jiggery - 15 grams

Procedure

- Trim, peel, and grate the beetroot
- Beetroot extract is prepared by cutting a fresh beetroot into small pieces which are blended well

- 50 ml of pulp diluted in 50 ml of boiled cool water and added 15 gm of jaggery
- Mix well
- Stain the beetroot and serve
- Take one cup of beetroot juice (100 ml) once a day

Recommended Daily Amount (RDA) For Pregnant (Woman)

Per 100 gm	RDA
Vitamin C	8%
Folic Acid (Folate)	75%
Potassium (K)	11%
Iron (fe)	7%
Zinc (Zn)	3%
Magnesium (Mg)	4%

Conclusion

Anaemia is a reduction in the oxygen carrying capacity of the blood; this may be caused by a decrease in red blood cell (RBC) production, or reduction in haemoglobin content of the blood, or combination of these. It is also a contributing factor to women developing health problems and dying during pregnancy and childbirth. In order to help to prevent anaemia in antenatal mothers, the nurse must help them to understand the medical problems that affect in future. The beetroot juice contributes to improve the haemoglobin in the blood. The cost of the beetroot is low when comparing with other iron rich vegetables and it can be stored easily. So, every antenatal mother should aware about benefit of beetroot.

A STUDY TO ASSESS THE EFFECTIVENESS OF BEETROOT EXTRACT ON REDUCING ANAEMIA AMONG ANTENATAL MOTHERS AT ARAVINDAN HOSPITAL, COIMBATORE

ACKNOWLEDGEMENT

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